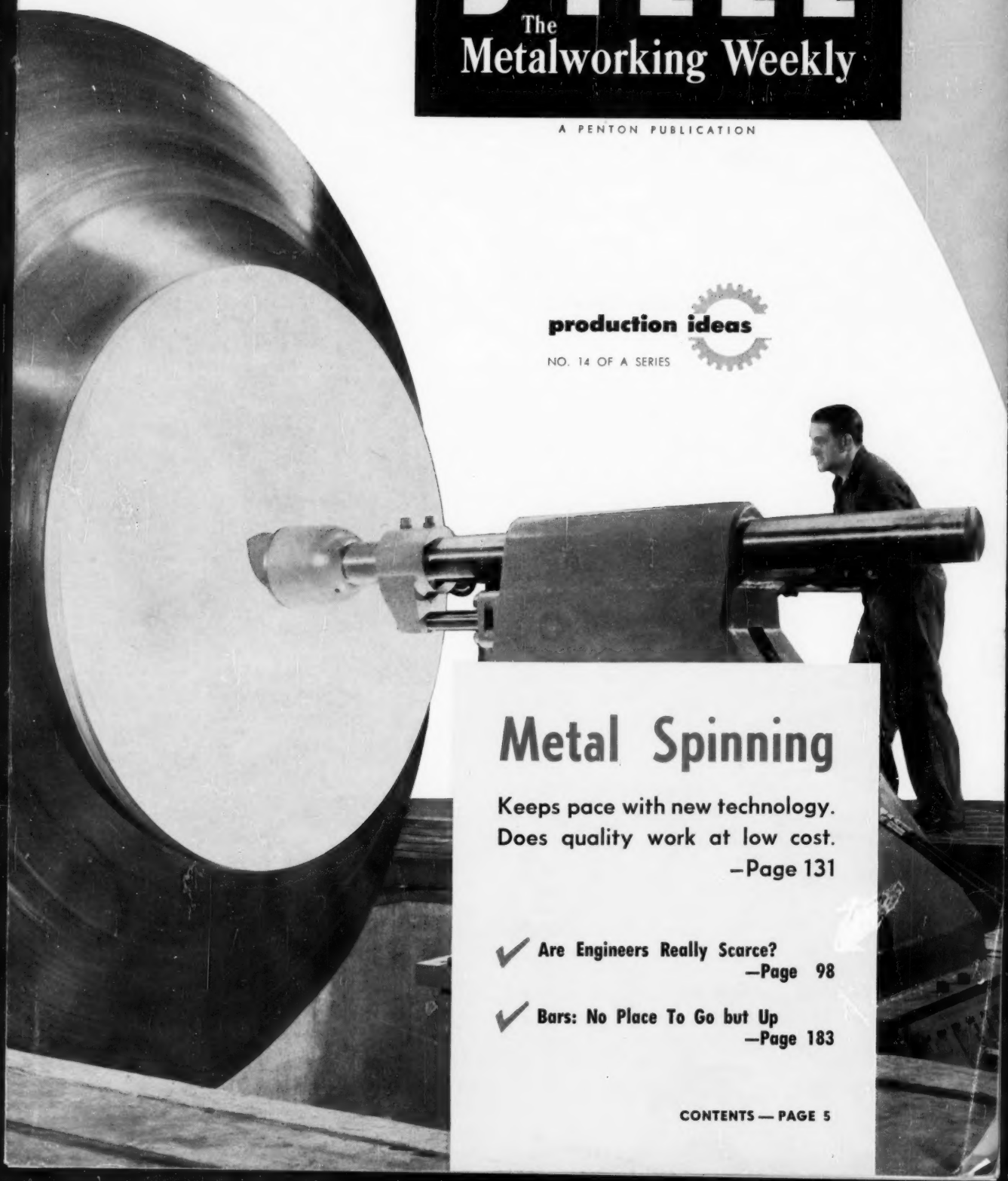
SEPTEMBER 2, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

production ideas

NO. 14 OF A SERIES



Metal Spinning

Keeps pace with new technology. Does quality work at low cost.
—Page 131

✔ Are Engineers Really Scarce?
—Page 98

✔ Bars: No Place To Go but Up
—Page 183

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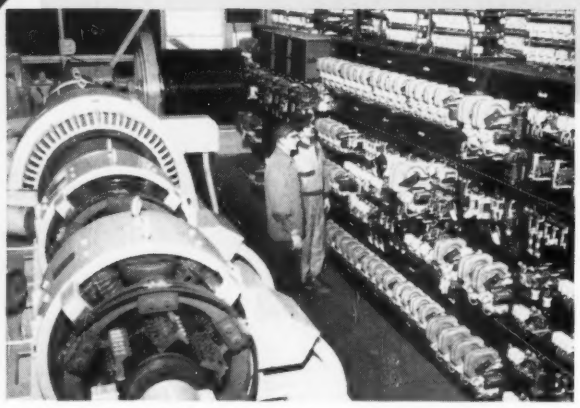
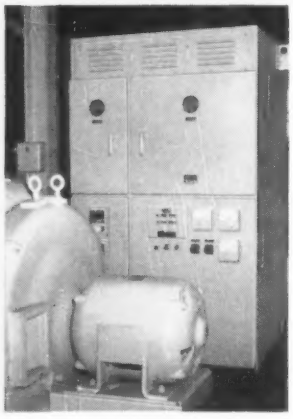
1800-TON-PER-HOUR DRAVO UNLOADER IN OPERATION AT PENNSYLVANIA RAILROAD'S GREENWICH POINT, PHILADELPHIA, ORE UNLOADING PIER

You're Under Way *Fast* WITH EC&M ADJUSTABLE VOLTAGE CONTROL!

EC&M Adjustable Voltage Control Panel *(mounted on trolley)* for Hold and Close Line Motors and for Trolley Motor, plus Protective Panel for other drives.



EC&M Control Panels for Hold Line, Close Line, Trolley, Turntable, Quadruplex Travel, Rail Clamps and Apron Hoist Motors are mounted in Machinery room, 100 feet above ground level, along with generators which supply DC power for unloader motors. Power resistors, mounted above Panels, are EC&M TAB-WELD.



EC&M Type ZHA 4160 Volt Starter provides pushbutton starting of 800 HP Elliott synchronous motor driving 4 generators.

This Dravo Unloader is typical of many prominent installations on which EC&M has worked with both unloader and motor builders to get machines into production quickly with minimum adjustment and "tune-up" time.

Equipped with a total of 20 motors ranging in size from 10 to 800 HP, this unloader takes giant-sized bites (22½ tons) of ore from a ship's hold on an average cycle handling time of 45 seconds. Frequently, the skilled operators lower the time to 36 seconds per trip.

The bucket (hold and close line motors) and trolley drive are operated by adjustable voltage control under current limit acceleration through rotating regulators. Constant potential control is used for the travel, rail clamps, turntable and apron hoist.

EC&M is prepared to supply complete equipment including control, brakes, limit stops and all rotating machinery. When planning adjustable voltage installations, consult EC&M for engineering assistance.

Photos courtesy Dravo Corporation, Elliott Company and the Pennsylvania Railroad

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

EC&M'S 60TH ANNIVERSARY • 1897-1957

9104

How to cut your wire-handling costs

You might be surprised at how much you can trim your costs with better methods of handling steel wire. For example, we often find that when coils of wire are unloaded in customers' plants they are simply piled on the floor. This wastes valuable floor space, and clutters the aisle. And moving the wire along to the production line becomes a headache.

One customer's excellent solution to the wire-handling and storage problem is shown above. The racks, built largely from steel pipe, more than triple the storage capacity of the floor area. Coils are out of the way, yet they're easily moved by lift truck.

Another customer wanted to avoid shutting down his cold-heading machines every time a coil of wire was used up. We showed him how to set up the wire coils on two pay-off reels so that no interruptions were necessary when one coil was welded to the other.

Users of wire in large coils often have a handling problem. In working out practical handling methods for extra-heavy coils, we try to help the customer avoid the nuisance and expense of returning pallets or containers.

Because we handle so much wire in our own plants, we have developed a lot of time-saving methods which we're glad to pass along. And we're ready to do more than just offer general suggestions. If you wish, we'll provide you with drawings and specifications for such things as pipe racks, pay-off reels, and other equipment that may help you to cut your wire-handling and storage costs.

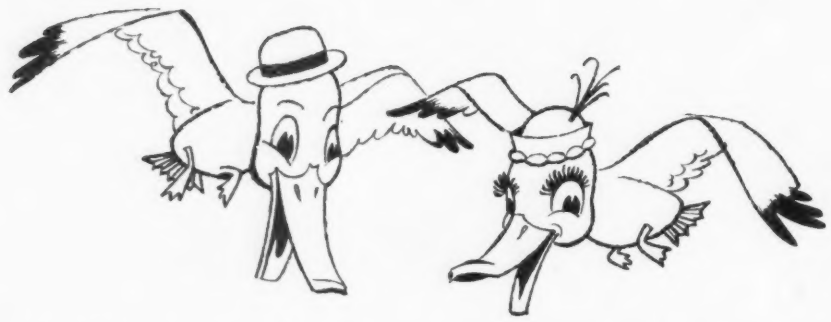
Our main job is to make top-quality steel wire to meet a wide range of requirements. But our service goes far beyond simply taking your order and shipping the wire. So don't hesitate to call our nearest sales office if you have a wire problem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

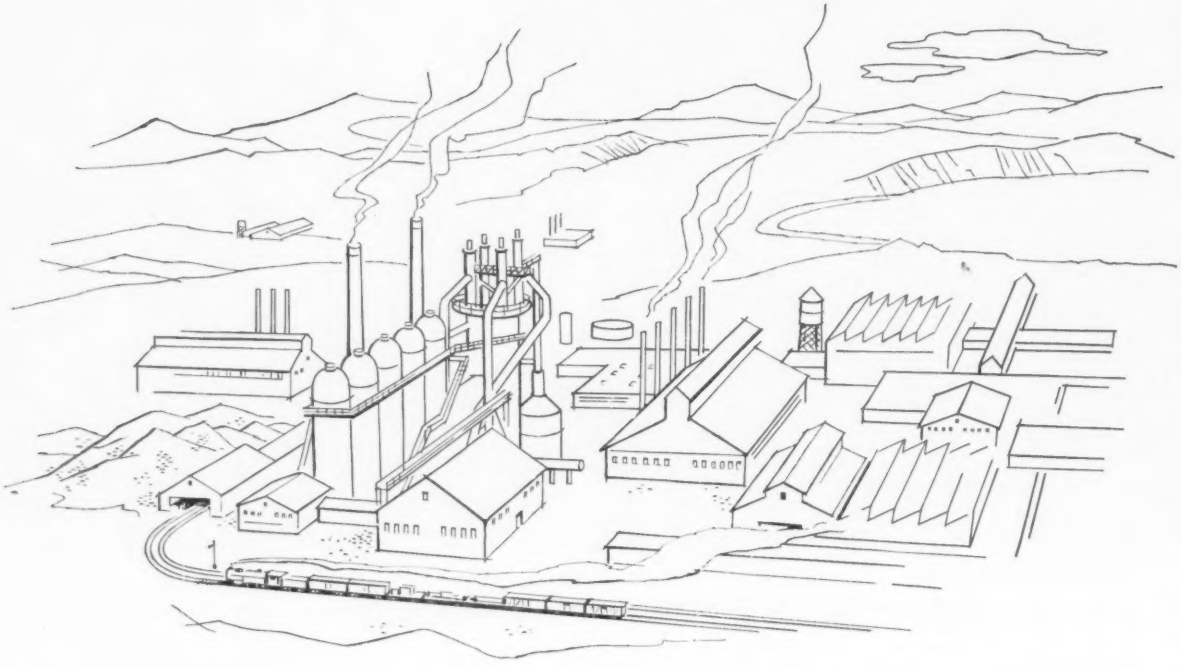
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



Production is smooth as water rolling off your back!



No wonder: **SKF**® has developed a roll neck mounting that meets the demands for higher speeds, closer gauge tolerances, better quality and heavier rolling loads. This multi-row has the features desired by every mill man – most usable capacity in a given space... easy to assemble and disassemble... uses oil or grease, even at high finishing stand speeds.

When you install a new mill, make sure it is equipped with **SKF** multi-row cylindricals. Or have an **SKF** engineer explain how your present mill can be changed over at minimum cost to eliminate roll neck troubles such as breakage, scuffing, excessive bearing failures or high maintenance time and cost. 7737

SKF

EVERY TYPE–EVERY USE

Ball Bearings
Cylindrical Roller Bearings
Spherical Roller Bearings
Tapered Roller Bearings (Tyson®)

® Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

You learn a lot in a hundred years... especially in the hundred just passed

—the greatest century of technical progress the world has ever seen. Born as it was, on the brink of the era, the growing Bliss Company was in a position to make a number of contributions to pressed metal-working... the first inclinable press, for example, and the famous rolling key clutch, the toggle press principle, pneumatic clutches, these are some of the more important ones.

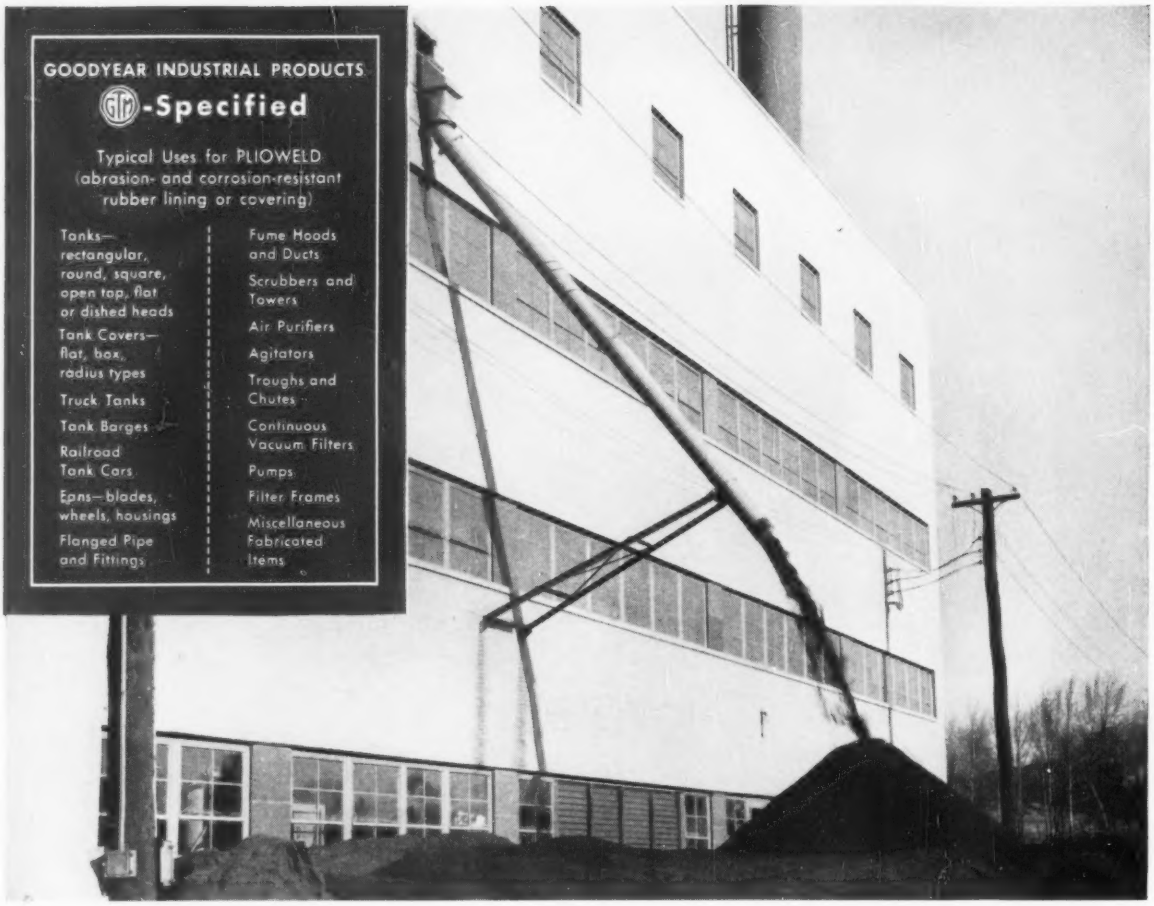
Proud? Of course we are—of these contributions and of the men who made them possible. For we've learned in our past century that: Any company, no matter what its size, is basically people... that a customer isn't a purchase order, but someone to whom we are responsible both now and in the future. This is part of what we mean when we say, "Bliss is more than a name... it's a guarantee."

BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • ROLLS • DIE SETS • CAN MACHINERY • CONTRACT MFG.



Steel chute "shot" in 18 months—rubber-lined, it lasts 6½ years!

It was a short life but a busy one for the steel-pipe coal chute used at this Pennsylvania plant. Each time the bunkers were filled, 60 tons of #3 barley coal—per hour—would chute out into the stockpiles. And this highly abrasive flow cut through heavy steel pipe in less than a year and a half.

Then the G.T.M.—Goodyear Technical Man—offered his suggestion: Line the pipe with PLIOWELD—Goodyear rubber lining that welds to metal by internal adhesion to form a remarkably abrasion-resistant surface. The results? *The rubber-lined pipe put in 6½ years of hard work—more than four times better than its unlined predecessor.*

Like to line up advantages and savings like these at your plant? Whether you use rubber linings or rolls – hose – belts – or any other industrial rubber products, the G.T.M. is your man. Contact him through your Goodyear Distributor or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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The Metalworking Weekly

September 2, 1957
Volume 141 No. 10

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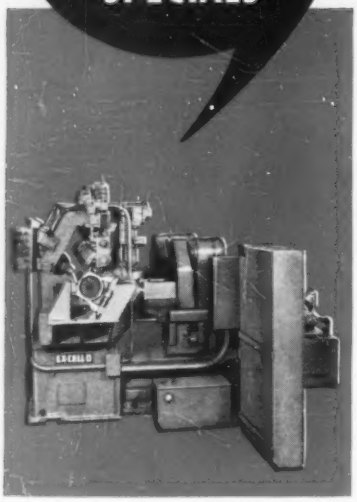
STEP-BY-STEP AUTOMATION WITH EX-CELL-O SPECIALS



Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.

XLO EX-CELL-O FOR PRECISION

57-88

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

behind the scenes

Salute to Toil

This week's STEEL bears the date of Sept. 2, which happens to be Labor Day, and we are not one to let an important date like this slip by unnoted. A majority of the world's inhabitants are required to earn their bread by the sweat of their brows, so everybody who works for a living is entitled to loosen his belt, take off his shoes, and settle back with a can of beer on Labor Day.

It is startling to consider how recently it was that labor assumed its standing in the civilized world.

The year 1900 is merely a few days away in time, yet the things labor advocated then shocked many governments so severely they summoned police and soldiers to straighten out labor's thinking. Labor delegates meeting in Basel, Switzerland, in 1896 represented Russia, Austria, Germany, France, Holland, Spain, and Italy. After they surmounted the language barrier, they voted (54-4) that landed property should be abolished. Then they briskly passed resolutions opposing standing armies and advocating universal suffrage, legislative protection of labor, nationalization of land, socialization of industry, and the 8-hour day. They repudiated all known anarchists and established themselves as pigeons for their separate governments.

Labor's Gains in U. S.

In America, of course, we could afford to chuckle at the antics of European labor organizers because we were improving the labor picture all the time. Indiana had a statute fixing minimum wages at 15 cents an hour for manual labor, but Nebraska went even farther: The Cornhuskers established an 8-hour day with enforced payment for overtime, but this ridiculous legislation was soon declared unconstitutional. Our southern states got on the bandwagon of progress, too, by 1905: They restricted the labor of children under 10 to 10 hours a day, nor would they permit them to work more than 58 hours a week. And some states, if you please, got so uppity they wouldn't allow women to work in mines.

Some of these reflections were stirred by the metal spinning story (Page 131) and a private report from the third scrap seminar conducted by the Institute of Scrap Iron & Steel Inc. the week of Aug. 11 at Michigan State University.

The metal spinning deal is No. 14 in STEEL's Production Ideas Series. The article suggests that spinning offers low cost and flexibility unmatched by other metalworking processes. Tooling costs are less, leadtime is shorter, design changes can be made easily. Metal spinning was practiced by the ancient Egyptians, and they were pretty good at it, too, in spite of the supposition that their products were the result of slave labor. (Labor; see? That's why we thought of Labor Day.)

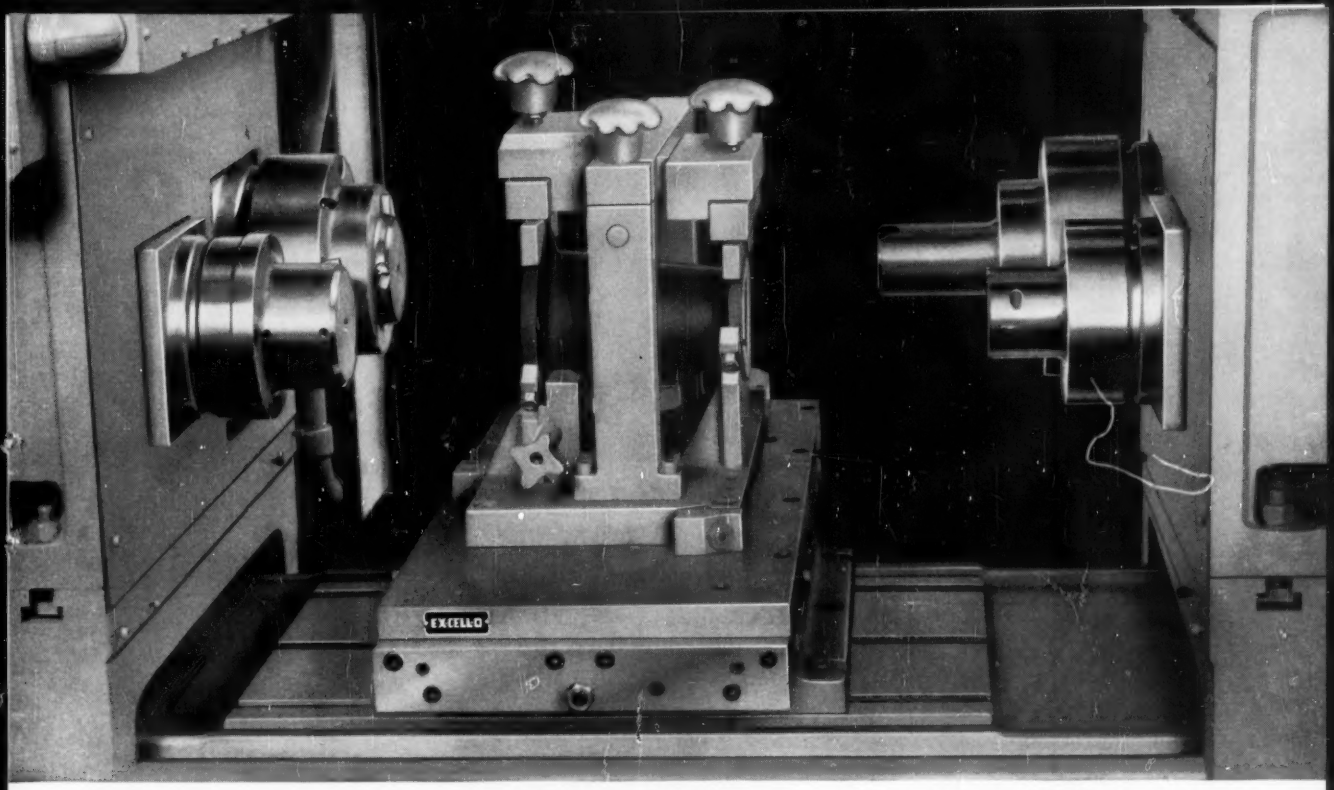
The other item, about the Scrap Institute, came to us directly from Associate Editor Horace (Goat Rock Sam) Samford. Sam attended the seminar, and was exposed to lectures and instruction for a week. He learned about insurance coverage of the scrap industry, safety in the scrapyard, transportation and elements of rate structures, recognition and segregation of alloy scrap, and a lot of dandy things like that.

"But the thought I carried away from that seminar," said Sam, in accents that purely dripped grits and blackeyed peas, "was the high moral tone evident everywhere. The past president of the Institute and chairman of the seminar was a gentleman named Herman D. Moskowitz. He talked more moral sense in 5 minutes than a passel of preachers. He told them boys that he knew 80 of the grandfathers and 50 of the fathers of folks at that meeting, and he said they had proved beyond a doubt that the only way to stay in business was to stress quality, honesty, fairness, and ethics."

Mr. Moskowitz, Sam concluded, "drew a picture of the way business ought to be conducted, and it seems to me if ever'body operated the way he does, this ol' world would be a more pleasant place to live in. . . My, I haven't talked so much since Alabama went to the Rose Bowl."

Shrdlu

(Metalworking Outlook—Page 81)



One of several fixture arrangements used for machining valve parts.

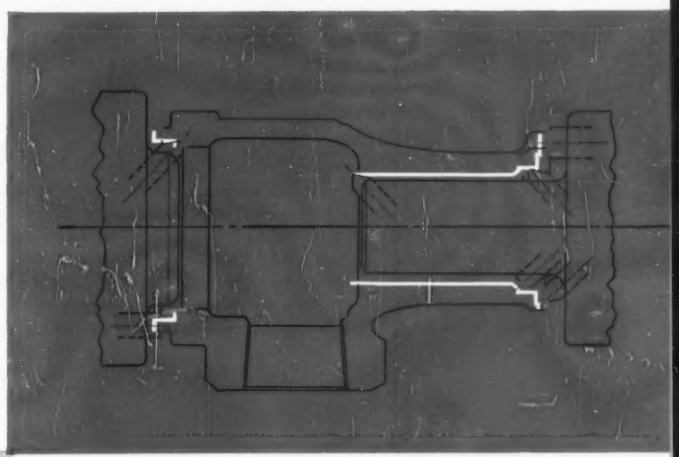
Fast and Flexible

SHORT RUN COST SAVER . . .

This Ex-Cell-O 17-A Precision Boring Machine rough bores, plunge faces, finish bores and chamfers a wide range of assorted cast-iron valve bodies and bases. Production schedules require relatively short runs of each size, so the tooling shown here has set blocks to accommodate the various parts.

Designed for medium and large size workpieces, the double-end 17-A Precision Boring Machine can handle identical operations at either end; rough at one end, finish at the other; or perform an entirely different operation at each end. So you can see the cost-saving versatility of this two-in-one machine.

Perhaps slow changeovers are inflating your production costs. If so, why not call your Ex-Cell-O Representative or contact Ex-Cell-O in Detroit.



White lines represent cuts made on a typical part.

Here are a few sizes of the valve bodies and bases processed on the Style 17-A Machine.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN
Machinery Division

XLO EX-CELL-O FOR PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

57-22

Youngstown cold finished bars

help build quality into ESNA Elastic Stop® nuts

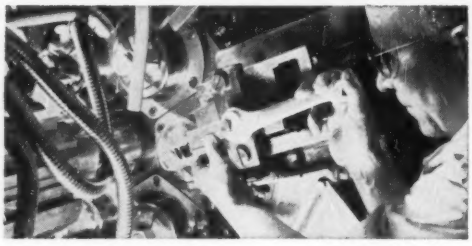
One of the most important operations in producing Elastic Stop nuts from Youngstown Cold Finished Bars. Here the bar is being cut to length to form the basic nut blank. Six spindle screws of the Automatic drill and ream the tap hole, cut and form the unclosed crown, drill and ream the insert well and finally, cut off the finished nut blank. The cold finished bar's quality must not vary as any hidden seams, pipes or center segregations could cause tooling and production breakdowns.

Youngstown Cold Finished Bars and Scrapless Nut Quality Wire play an important part in the "Elastic Stop Nut Story". They're the basic raw material used to produce these well-known self-locking fasteners familiar to almost every industry throughout the world.

These Youngstown products give Elastic Stop Nut Corporation of America long, trouble-free production runs. That's because they are quality-controlled throughout all of Youngstown's integrated steelmaking operations—from mining the iron ore to final cold drawing.

They give your operators the best chemical composition, physical structure and surface finish—a direct result of Youngstown's more than a half-century of quality steelmaking know-how. Why not make them your permanent specification for continuing high product quality and uniformity.

For more detailed information or metallurgical assistance, write or call our nearest District Sales Office today—or write directly to our General Office.



COLD FINISHED BARS
AND SCRAPLESS NUT
QUALITY WIRE

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

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Exclusive features of Landis Universals shorten setup time . . . lower costs on grinding small parts

Landis 10″ x 20″ and 10″ x 24″ Universal Grinders for toolroom or short runs where parts require high precision and fine finishes.

Exclusive eye-level *wheel feed* for easier operation, less chance for errors, quicker setup.

Exclusive swing-type internal grinding fixture with belt guard. Fixture does not interfere with operator when locked in raised position.

LANDIS
precision grinders
LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

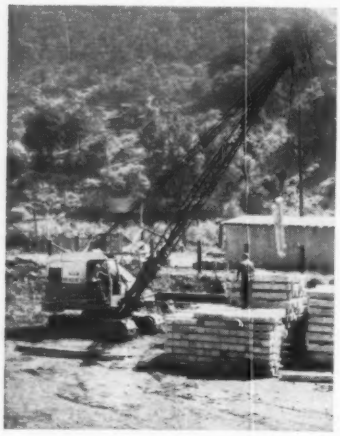
THREE TYPES of 22-B Cranes Answer THREE Handling Needs

PROBLEM: Crane needed to handle lifting assignments in widely scattered locations; must have good mobility and long reach.

SOLUTION: **Bucyrus-Erie 22-B Transit Crane,** combining heavy-duty features with rubber-tired mobility, handles booms 30 feet (standard) to 80 feet (with removable inserts), has lifting capacity of 25 tons. A Transit Crane moves from job to job fast and, on reaching the job site, is ready to go right to work. Extendible outriggers provide a sturdy foundation.

PROBLEM: Crane needed for precision lifting, sometimes in locations where the ground is soft or rough.

SOLUTION: **Bucyrus-Erie Heavy Duty 22-B,** specially designed for jobs that require extra precision and stability, is the answer here. Long, flat crawlers with 30-in. treads keep the machine stable and maneuverable even on soft or uneven terrain. Friction swing brake and power boom hoist with power controlled lowering for the main hoist line permit delicate positioning of loads.



PROBLEM: Crane needed to handle a variety of work under all kinds of working conditions with minimum downtime.

SOLUTION: **Standard Bucyrus-Erie 22-B crane** with 35-ft. boom extendible to 70 feet provides reach needed for high lifts. Sturdy crawler mounting assures good stability and high maneuverability. Independent power boom hoist and responsive controls permit accurate placement of loads. The result is dependable service from the easiest to the toughest jobs.

Bucyrus-Erie 22-Bs can help you save money through efficient, long-term service. For complete information on any or all of these models, see your local Bucyrus-Erie distributor today, or write direct.

374E57

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

LETTERS TO THE EDITORS

Secrets Given to Competition

With reference to your Windows of Washington item, "U. S. Gives Away Your Secrets" (July 22, Page 64), a flagrant case of this kind is illustrated in the experience of a St. Louis company following World War I.

According to our recollection of the circumstances, the U. S. Bureau of Standards went into the plant, studied and recorded the processes, and made them available to the world (competition included) at 10 cents per copy.

M. G. Stewart
President
Pelican Supply Co. Inc.
Shreveport, La.

Query on Low Finance Terms

In your Metalworking Outlook column of Aug. 12 (Page 68), you state in the paragraph, "Better Finance Deals Needed," that one finance company requires only 10 per cent down and three years to pay.

This is of great interest in these days of intense competition for capital support. I would appreciate knowing which of the finance companies is doing business this way.

R. E. W. Harrison
President
Harrison Engineering Services
Washington

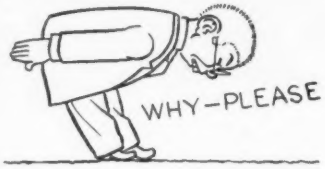
• *For information, write: Foundation for Management Research, 121 W. Adams St., Chicago 3, Ill.*

'Eye Opener' Article

The twelfth article, "Rolls Forge Precision Parts" (July 8, Page 97), in your Production Ideas series is very much an "eye opener." It should draw the attention of forging suppliers. I would appreciate two copies.

K. H. Bradshaw
Forging Buyer
Caterpillar Tractor Co.
Peoria, Ill.

Japanese Checks on Carbon



After reading the market prices for ferrochrome and ferromolybdenum on Page 176 of your June 24 issue, we have some questions:

Why is the price for a ferrochrome with 0.025 per cent maximum carbon lower than the price for a grade with higher carbon content, such as 0.1 per cent maximum?

How much carbon is in ferromolybdenum?

Y. Matsunaga
Technical Superintendent
Nippon Yakin Kogyo Co. Ltd.
Toyko, Japan

• *Chromium content largely determines the price of ferrochrome. The grades with the higher carbon content cost more because they also have a higher*

(Please turn to page 12)

A Bundle of the Best...

and there's a size and type of Wallace Barnes high carbon strip steel to meet *your* specific use. Supplied in annealed state, hard-rolled, and hardened and tempered. Great forming properties, too. Get the facts.

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ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

DIVISIONS OF ASSOCIATED SPRING CORPORATION — COAST TO COAST

ALSO MAKERS OF SPRINGS • WIRE FORMS • SMALL STAMPINGS

5719
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...here's one that lasts

There's an element of abrasion, too, in addition to the heat and some corrosion. It's a 3-way problem which our metallurgists recognize and understand. Duraloy Flights used in many kilns are taking care of these three requirements very satisfactorily.

While chromium and nickel in varying proportions are the principal alloying elements in most high alloy castings, sometimes operating conditions call for several alloying elements and knowledge of how to use them to bring out certain special characteristics.

In our thirty-five years of high alloy casting experience we have encountered and solved some very difficult corrosion — temperature — strength problems. Perhaps we can help you in connection with your high alloy casting requirements.

The DURALOY Company
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

LETTERS

(Concluded from page 10)

chromium content. The low-carbon ferrochrome with 0.025 per cent carbon has a chromium content of 63 to 66 per cent. Grades with carbon maximums of 0.03 through 2.00 per cent have chromium contents of 67 to 71 per cent.

Ferromolybdenum contains from 0.10, 0.60, or 2.50 per cent carbon, depending upon the grade. For additional information, write: Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y., or Molybdenum Corp. of America, Grant Bldg., Pittsburgh, Pa.

New Parts Making Methods

If reprints of the fine article, "A Look Ahead at Part Making" (July 29, p. 112) could be furnished, eight copies for the information of development engineers in the Ordnance Weapons Command would be appreciated.

G. Reinsmith
Chief, Research Office
Headquarters, Ordnance Weapons Command
Rock Island, Ill.

Compliments Job STEEL Does

We have on numerous occasions noted many interesting and informative features in STEEL and would like to take this opportunity to compliment you on a job well done.

Specifically, we have noted with unusual interest the editorial, "Parable of the Prices" (July 15, Page 51). Its theme is exactly that which we have tried to eulogize ourselves but without success.

We would appreciate permission to reproduce it on the back page of a circular we are planning on the subject of product pricing.

George R. Platt
Advertising Director
AerVoid Vacuum Can Co.
Chicago

• *Permission granted.*

We think this is one of the cleverest of Editor's Views we have ever seen. We would appreciate two dozen tear sheets.

G. A. Cairns
Macco Products Co.
Chicago

Stainless Weld Interest

We have read with interest, the article, "How To Avoid Trouble with Stainless Welds" (June 24, Page 116). We would like five reprints of it as well as Part II.

D. J. Schaefer
Champion Rivet Co.
Cleveland

Marketing Draws Interest

I have been much interested in the article, "Needed: More Marketers" (Aug. 5, Page 66). Would it be possible for you to send four reprints?

R. G. Hess
General Manager
Washburn Co.
Worcester, Mass.

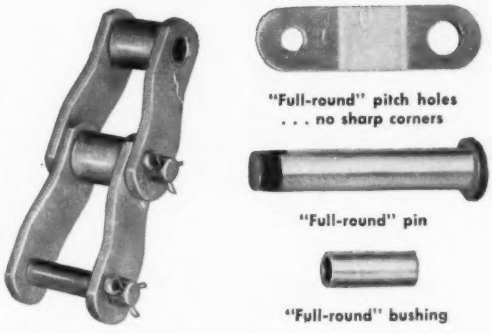
Tool Geometry Important

The article, "Guide to Carbide Tool Geometry" (July 8, Page 110), is of considerable interest to us. We would appreciate three reprints.

Armand J. Ledoux
Executive Vice President
Black Rock Mfg. Co.
Bridgeport 5, Conn.

"Stress raisers" eliminated by Link-Belt LXS chain design

LXS "FULL-ROUND" DESIGN



"FULL-ROUND" DESIGN eliminates stress concentration points. Heat treatment of all parts adds even greater strength and extra wear life to selected steels. Accurate control of these processes avoids brittleness, poor wear values and low tensile strengths . . . and assures uniformity.

Large pins, bushings mean ample live bearing area for long life

For long life under severe conveyor and drive conditions, Link-Belt LXS chain provides extra strength, increased wear resistance and wider application flexibility. This fabricated steel roller chain incorporates many advanced design and manufacturing refinements, resulting in superior ruggedness and accuracy.

Eliminate weak points

"Full-round" design does away with stress concentration points most frequently subject to failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly, increasing chain life.

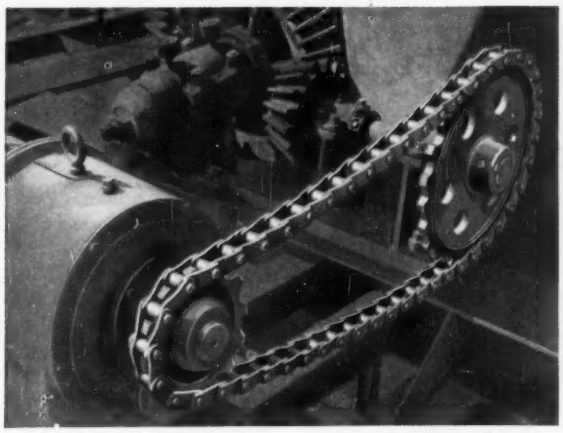
Pins and bushings are accurately sized for controlled press fit, preventing rotation in sidebars. Made from selected bar steel, sidebars are carefully machined for proper pitch hole size and for maintaining firm, tight press fit of pins and bushings. This assures close control of pitch and proper chain length after assembly.

Hardening extends life

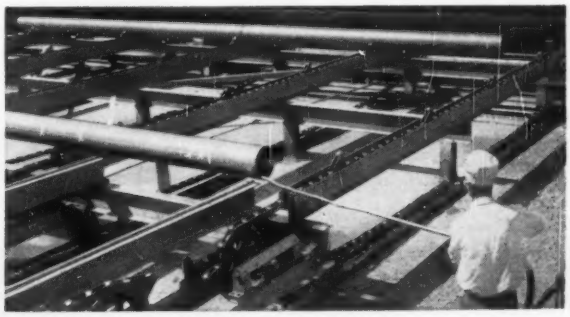
Another Link-Belt long-life extra is the controlled hardening of selected steels used in the manufacture of LXS chain. Pins, for example, are made from a tough steel, specially treated for high strength in shear and for maximum wear value. Bushings are properly hardened to shrug off shock and resist wear.

Rollers are accurately machined to assure proper operating clearances and free-rolling action. Controlled hardening gives them the necessary resiliency and durability.

LXS especially popular for exposed drives, high impacts



Link-Belt LXS chain is the long-life answer for exposed drives, abrasive and high-impact conditions. Its large, live bearing area reduces cutting action of abrasives because load is spread over a broad area.



LXS chain provides extra strength, wear-life for heavy-duty conveying

Link-Belt LXS chain has real stamina—as shown in this conveyor application for handling 1000-pound, 40-foot lengths of steel pipe. Thanks to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life for the extra-long conveyors so popular in today's move to mechanization.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,257

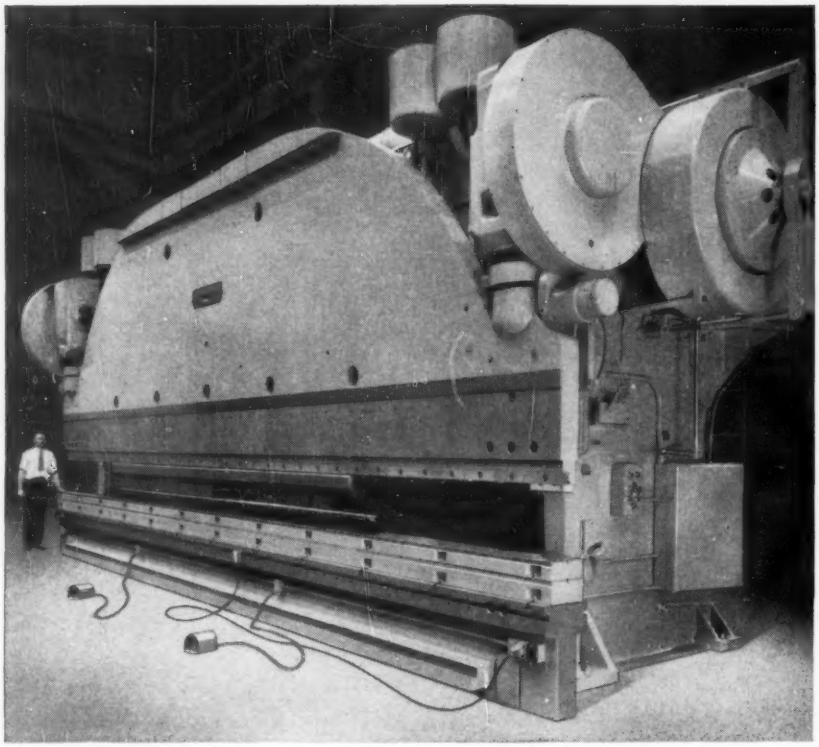
CINCINNATI
PRESS BRAKES

There are over 80 standard machines in the Cincinnati Press Brake line, ranging in length from 4′ to 20′ between the housings. 15 different tonnage capacities are available. Although they differ widely in size and capacity, they all have one feature in common . . . ***accuracy.***

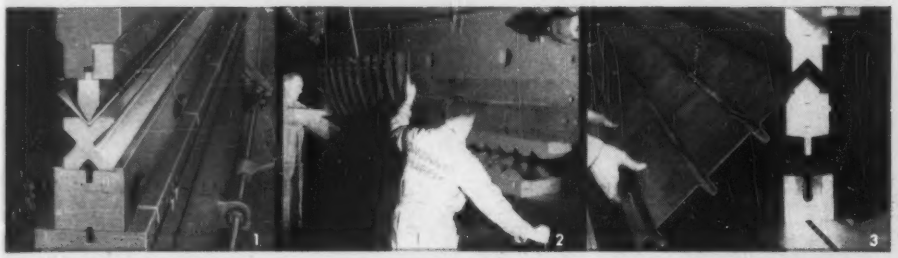
This isn't an unsupported claim. The accuracy of the thousands of Cincinnati Press Brakes in operation has been time-proven . . . just check the production record of any one of them. A few of the features which contribute to this accuracy are:

- All-Steel, interlocked construction—no welds used as load supports, yet the bed is directly supported by the housings.
- Centerline loading—no weaving of the frame, since forces are contained within the housings.
- Deep beds and rams—depth in these members means rigidity, and rigidity means accuracy.

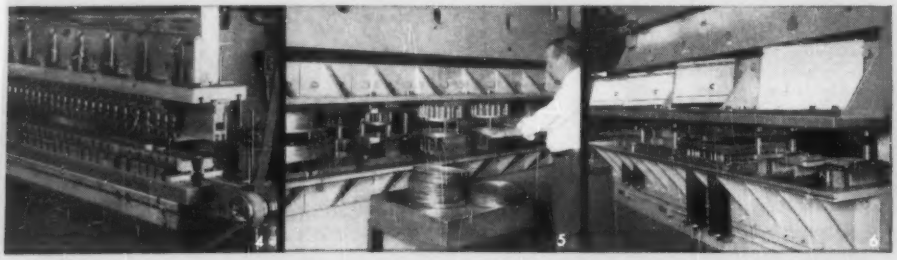
Write Dep't. C for Catalog B-5.



AND . . . . PRESS BRAKE DIES



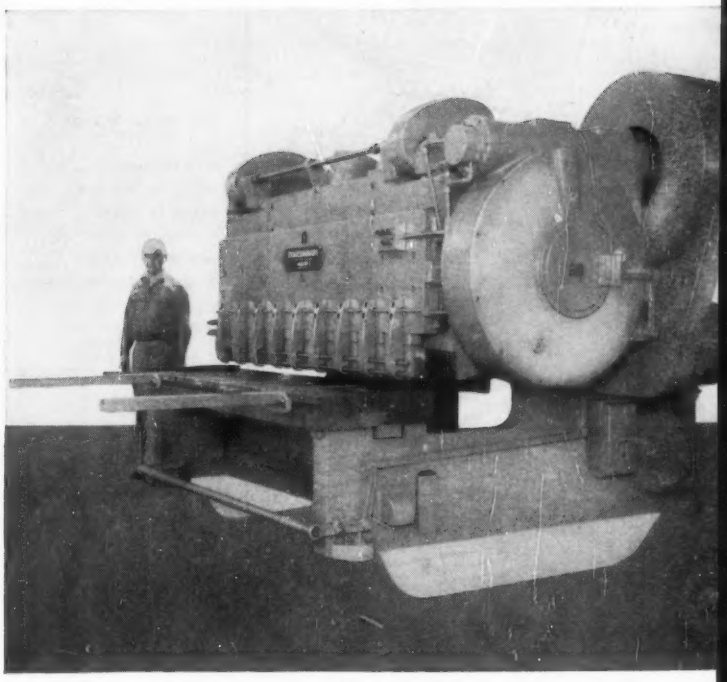
A 4-way die, equal to 4 V-dies, is shown in No. 1. No. 2 shows culvert sections being formed in repeat hits. Roof decking is made with the dies shown in No. 3.



No. 4 shows a punching setup with gags. The progressive setup in No. 5 does punching and drawing. The progressive setup in No. 6 makes refrigerator top parts.

We are prepared to design and furnish the tooling needed to convert your ideas into finished products. A background of 30 years of experience is represented in our Application Engineering Department, in literally every field associated with our machines. The photos at the left show just a few examples. For complete information, write Dep't. C for Catalog D-2.

CINCINNATI SHEARS

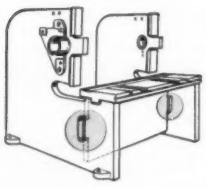


Cincinnati All-Steel Shears combine micrometer accuracy with high speed operation. Straight and parallel cuts are consistently produced, so accurately that only a micrometer can detect any variation in width of the sheared piece.

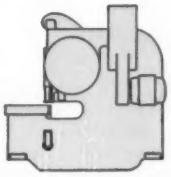
This accuracy doesn't call for special skill or manipulation on the part of the operator. As a matter of fact, Cincinnati Shears are built to cut all thicknesses, from thin material up to capacity, ***without changing knife clearance.*** This prevents accidental damage and eliminates interruptions in production.

Dependability, equally important, is insured by Cincinnati interlocked construction. No welds are used as load supports, yet the bed is directly supported by the housings. All-steel frame members minimize deflection.

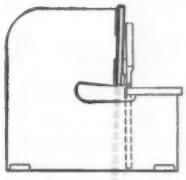
The sketches below show a few important features. For full information, write Dep't. C for Catalog S-7R.



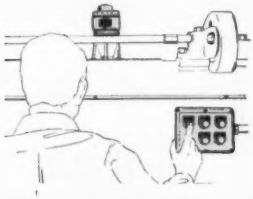
Interlocked construction means no welds used as load supports



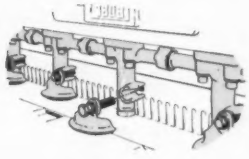
Gap frames allow shearing pieces longer than the machine



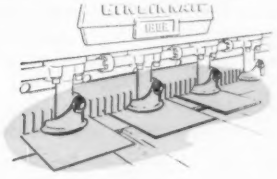
Inclined ram offsets the thrust caused by shearing action.



Front-controlled power back gauge is accurate, fast, convenient.



Hydraulic holdowns exert tons of pressure, insure accuracy.

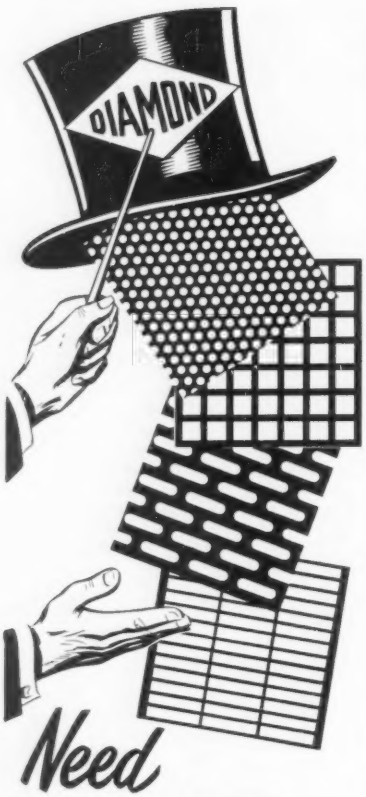


Different gauges, held with same tonnage, can be cut together.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES

CINCINNATI



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Engineers and Designers will find all the information they need, to make a quick, accurate, selection from standard Diamond perforating patterns and sizes, in our 36-page Catalog No. 39. No charge or obligation: we're glad to send it to anyone who can use it to advantage. Estimates submitted promptly.

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60 CYCLE INDUCTION MELTING

Melting metals in the 60 cycle induction furnace will bring greater economy and quality to your melting and casting operations. Whether you produce zinc or aluminum die castings, brass or bronze castings, ductile iron castings, or aluminum extrusions — to name but a few fields — there is an induction furnace to do your job.

60 cycle induction melting will reduce metal losses to a minimum and eliminate metal contamination. Alloy composition is maintained uniformly, and metal temperature is closely controlled at all times. Operating conditions are ideal: worker fatigue is reduced significantly.

AJAX ENGINEERING CORPORATION has specialized in just this one field: building the best and most efficient 60 cycle induction melting furnace for the job. As pioneers of this melting principle we have accumulated considerable experience in each field of application.

AJAX induction furnaces have been instrumental in establishing new metallurgical processes such as continuous casting, continuous galvanizing, and aluminum coating of steel. Exclusive AJAX developments are the electromagnetic pump and the AJAXOMATIC for controlled pouring.

AJAX 60 cycle induction melting furnaces range in size from 20 kw to 2000 kw, produce from 150 pounds per hour up to 40 tons per hour.

MAY WE HAVE YOUR INQUIRY?

ajax

ENGINEERING CORPORATION

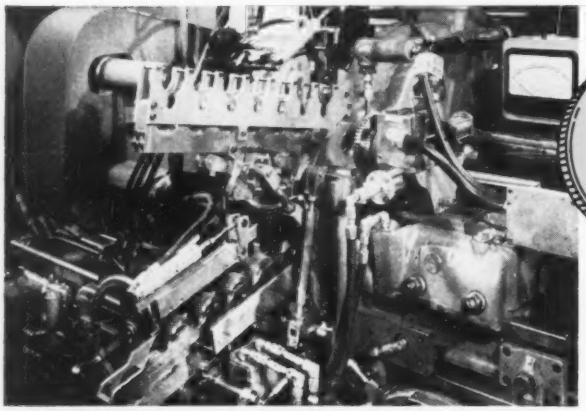
TRENTON 7, NEW JERSEY

Associated Companies: Ajax Electric Company Ajax Electrothermic Corp.

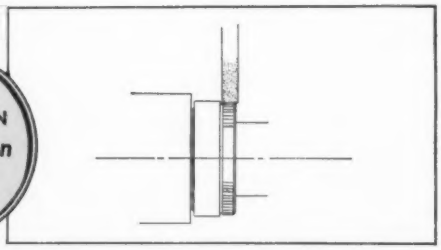
The more you grind the more you save with Norton...

cost-cutting automatic operations

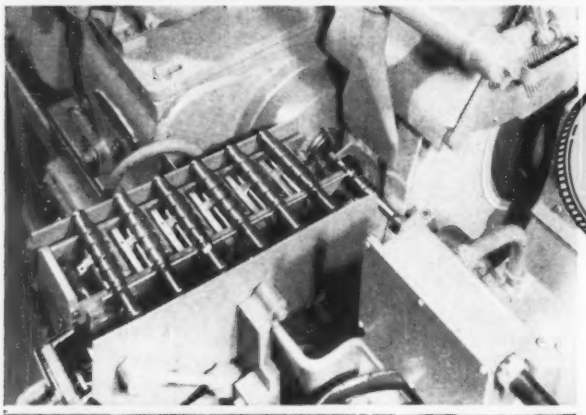
Typical automatic features on Norton grinders



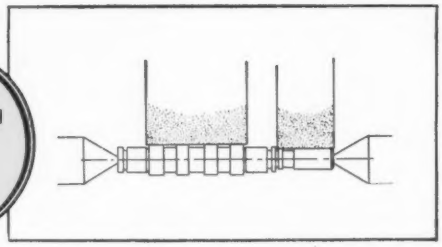
SAVINGS ON *Transmission Gears*



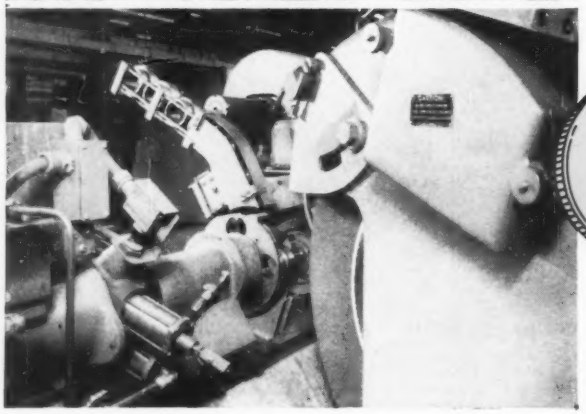
In a Type CTU Cylindrical Grinder arranged for completely automatic loading, grinding, and unloading of transmission gears, the part is held on a chuck and grinding cycle is terminated by an automatic air-electric grinding gage that signals when work is to size.



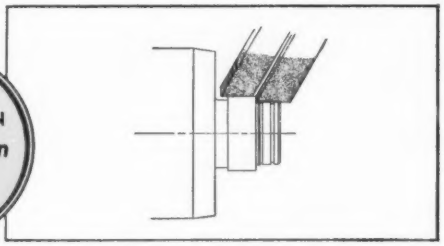
SAVINGS ON *Valve Pistons*



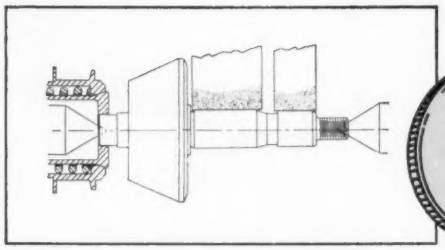
When a Type CTU Grinder is arranged for fully automatic loading and grinding of valve pistons the part is held on centers and driven by a floating type collet. Work is ground by a double-wheel mount.



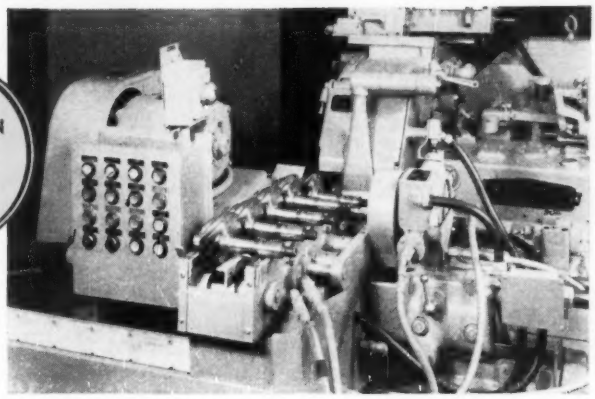
SAVINGS ON *Transmission Sleeves*



On this Type CV-4 Angular Wheelslide Grinder chucked grinding of transmission sleeves is arranged in a completely automatic cycle. Longitudinal movement of a revolving turret loads the machine. A stripper type plate removes the piece when turret retracts as the grind is terminated by electrically timed control.



SAVINGS ON *Stem Pinions*



The Stem Pinion Grinder reduces time and effort with a completely automatic cycle, electrically timed arrangement for grinding these hard-to-handle parts. Progressive escapements in the automatic loading mechanism release the parts in succession, avoiding gear mesh.

NEW ECONOMY!

Norton No. 2 Unitized Transfer Grinder Grinds Crankpins Automatically

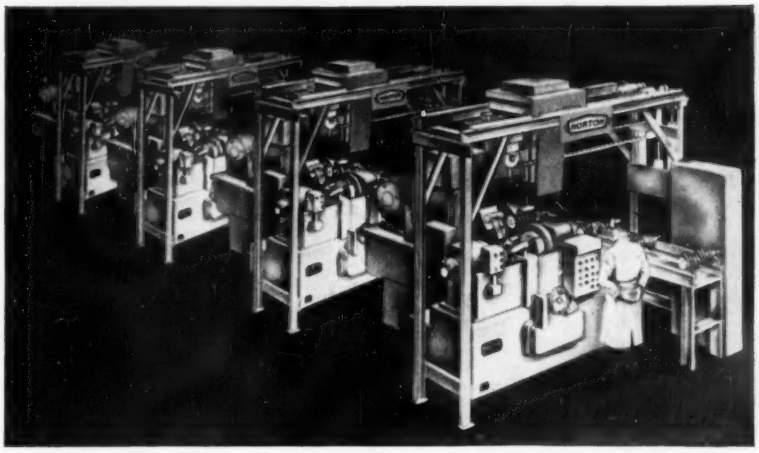
Here's a newly developed machine that automatically grinds crankpins faster and for less money than ever before possible. Advanced features like the following are reasons why:

Unitized Operation. Each grinding station, operating independently, can be automatically by-passed without affecting continuous production.

New Transfer Mechanism. Double set of hooks speeds loading, unloading and transferring of crankshafts from one grinding unit to another.

Fast Production. Cycling grinds 240 crankpins on 60 V-8 crankshafts per hour, due to many automatic operations.

Only One Operator Needed. Others are freed for different jobs. And the machine reduces floor-space requirements.



Norton has developed a wide range of fast, automatic grinders. You can get them in conventional and angular wheelslide types — also in special types for grinding automotive valve faces and crankshaft pins.

Remember: only Norton offers you such long experience in both grinding machines and wheels to bring you the "Touch of Gold" that helps you produce more at lower cost.

For further information about these machines — including how the No. 2 Unitized Transfer Crankpin Grinder can save you many dollars daily — contact your Norton Representative. Or write to NORTON COMPANY, Machine Division, Worcester 6, Mass.

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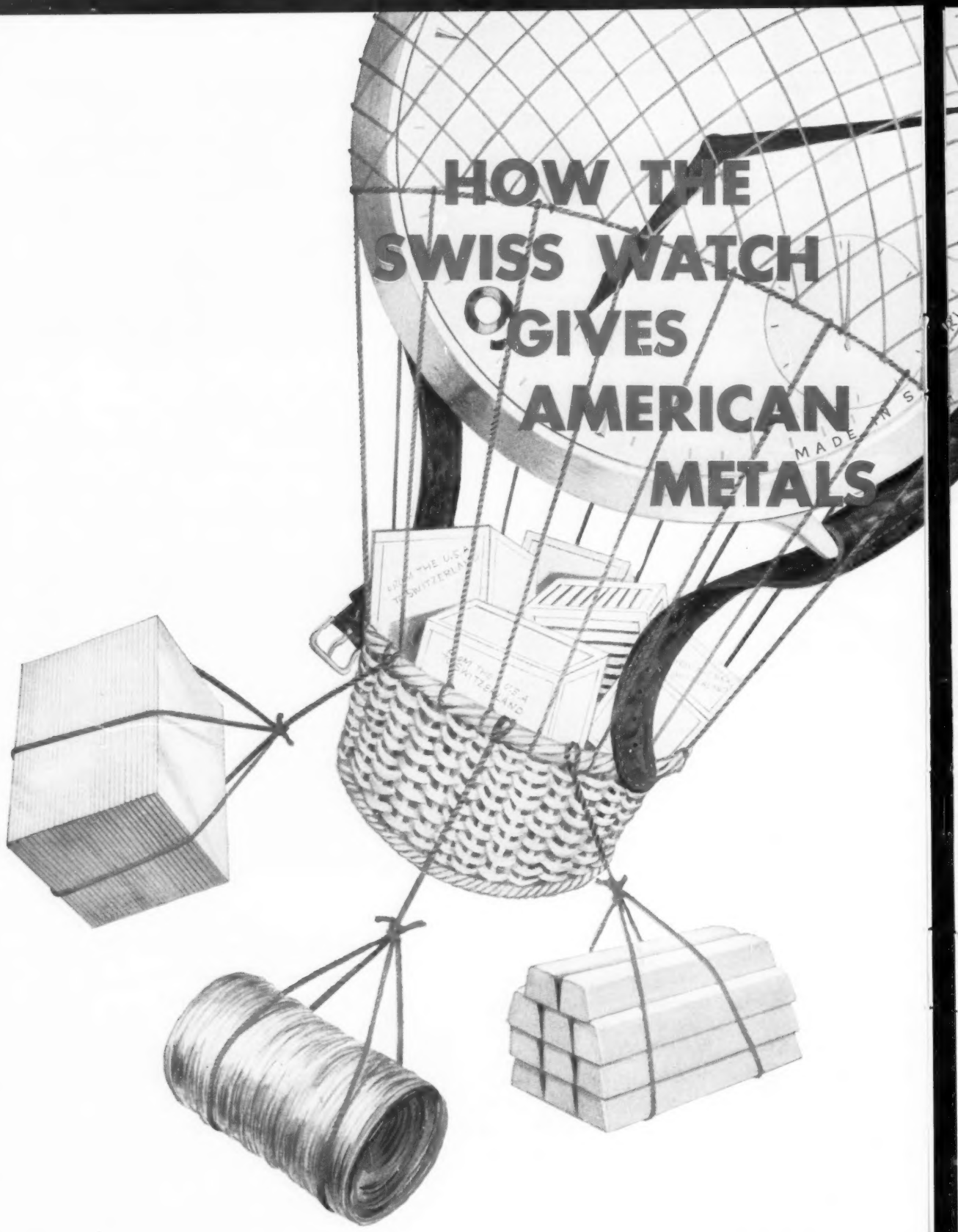
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GIVES
AMERICAN
METALS

A $32,531,183 LIFT

It's tough as tungsten, that little Swiss watch!

Last year alone, it helped carry $32,531,183 worth of American metals some 4,000 miles to Switzerland. Steel and iron sheets. Zinc and copper bars. Steel wool and wire. The precision tools the precision-minded Swiss admire. Almost every type of metal Americans manufacture or mine.

What makes Swiss buying power tick? It's the kind of buy-and-sell economics you practice every day. The Swiss buy American goods with the proceeds of what they sell over here. About half their sales are the products of their three-hundred-year-old watch industry. And the Swiss pay as good customers do . . . *in cash!* It's all trade. No aid.

As a matter of fact, Switzerland is America's best cash customer in Europe. A customer who has spent in America every dollar she has earned in America since 1946—plus 50% more. American business has gained a fat, favorable trade balance of $500,000,000!

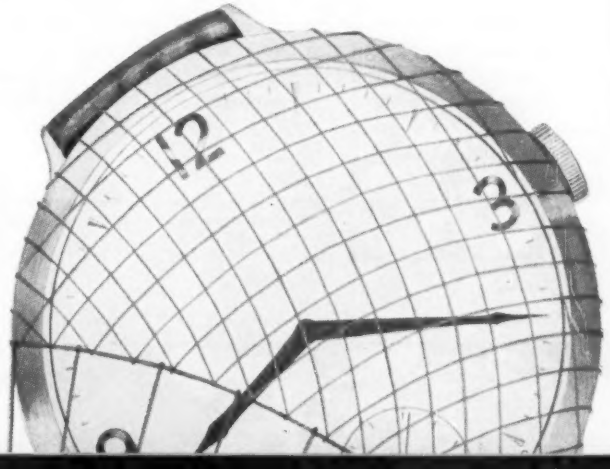
This trade between Switzerland and America runs on a two-way street. Today's lively traffic on the two-way street was set in motion by the reciprocal trade agreements of 1936 between our two democracies. But if the street is narrowed, the traffic could slow down.

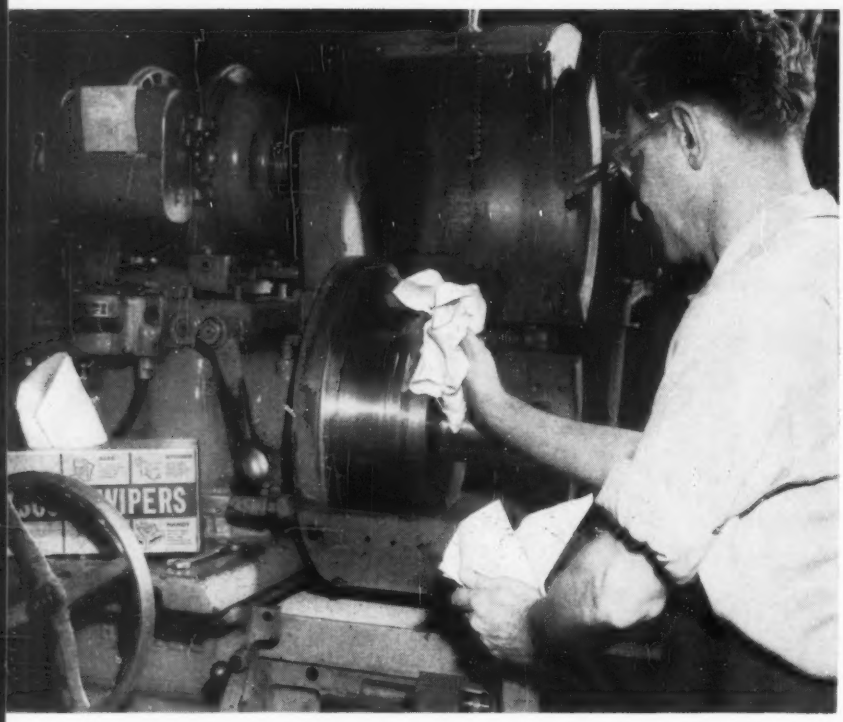
In 1954, America hiked the tariff on jeweled-lever Swiss watch imports by a huge 50%. Since then, further restrictions are being considered. And they could price the Swiss watch right off the wrists of Americans!

But the friendship between the Swiss and the Americans has gone on for a long time, since before our great-grandfathers were born. And the reciprocal trade between us has gone on for a long time, too. It was brought about by men of good will and good business. Surely, today's men of good will and good business will want to prevent anything coming between us now.

Published in recognition of the 106th anniversary of The Treaty of Friendship and Commerce pledged between the people of America and the people of Switzerland

THE WATCHMAKERS OF SWITZERLAND





At American Can, Chicago, Scott Wipers* are used for cleaning shop machines, tools and parts in process. 2-ply paper Scott Wipers are Perf-embossed,® a special process which speeds absorption, gives more thorough cleaning action.

*PATENT PENDING

WIPER PROBLEM? Look what Canco did with Scott Wipers!

American Can Company's Chicago plant makes cans for foods, paints, oils, waxes, insecticides and many other products. Scott Wipers were put on a 2-month trial basis in October, 1954 . . . and they're *still* here, serving every day throughout the plant.

The trial proved that Scott Wipers provide worthwhile savings, are safer, more sanitary. Eliminate the expenses of collecting, counting and laundering of used wipers. Simplify storeroom record-keeping. And Canco management liked the thought of employees having clean, sanitary Scott Wipers—each one *fresh from a box*, with no clinging burrs or foreign particles to cut and scratch hands and face!

Employees liked them at once. Today soft, absorbent Scott Wipers are used by machine operators, maintenance men, inspectors. They're tough enough to do wiping jobs better . . . and they're disposable, for better housekeeping. Your local Scott distributor will help you set up a test of Scott Wipers in *your* plant—or write: Scott Paper Company, Department S-79, Chester, Pennsylvania.

SCOTT PAPER

Maker of the famous Scott paper products you use at home. See "Father Knows Best" and "The Gisele MacKenzie Show" on NBC-TV.

CALENDAR
OF MEETINGS

Sept. 9-11, American Mining Congress: Metals mining and industrial minerals convention, Utah and Newhouse Hotels, Salt Lake City, Utah. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president and secretary: Julian D. Conover.

Sept. 9-12, Society of Automotive Engineers: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 9-13, Instrument Society of America: Annual instrument - automation conference and exhibit, Public Auditorium, Cleveland. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 11-14, National Metal Trades Association: Eastern plant management conference, Claridge hotel, Atlantic City, N. J. Association's address: 337 W. Madison St., Chicago 6, Ill. Secretary: Charles L. Blatchford.

Sept. 12-14, Automotive Parts Rebuilders Association: Annual meeting and exhibit, Congress Hotel, Chicago. Association's address: 220 S. State St., Chicago 4, Ill. Executive secretary: Jack O'Sullivan.

Sept. 17-18, Electronics Industries Association: National technical machine tool automation meeting, Ambassador Hotel, Los Angeles, Calif. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

Sept. 17-20, American Die Casting Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 18-20, National Industrial Conference Board: Marketing meeting, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 20, Malleable Founders' Society: Fall meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Sept. 21-24, Steel Founders' Society of America: Fall meeting, Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Secretary: George K. Dreher.

Sept. 22-24, American Machine Tool Distributors Association: Annual meeting, Hotel Cleveland, Cleveland. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelly.

Sept. 22-25, American Institute of Wholesale Plumbing & Heating Supply Associations Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Institute's address: 402 Albee Bldg., Washington 5, D. C. Executive secretary: George T. Underwood.

Sept. 23-25, American Society of Mechanical Engineers: Fall meeting, Hotel Statler, Hartford, Conn. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 23-26, Association of Iron & Steel Engineers: Annual convention, Penn Sheraton Hotel, Pittsburgh. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 26-27, American Hot Dip Galvanizers Association Inc.: Semiannual meeting, Netherland-Hilton Hotel, Cincinnati. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Sept. 29-Oct. 3, National Screw Machine Products Association: Fall membership meeting, Broadmoor Hotel, Colorado Springs, Colo. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

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Lithium metal, processed by Foote to a purity of 99.8% Li, is used extensively for alloying, deoxidizing, degassing, and scavenging a variety of metals.

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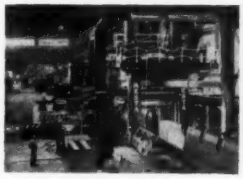
The high purity of Electromanganese is the metallurgical key to the development of 200 series stainless as well as other steels requiring critical control of carbon and other elements.



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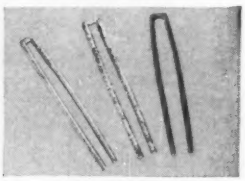
Rimex, developed by Foote Research Laboratories, improves rimming, minimizes ingot growth, and does not generate obnoxious fumes.



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The controlled purity of these metals helps metallurgists develop dependable metal formulations for current uses as well as those of the future.

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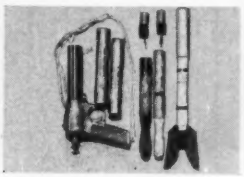
Foote's lithium compounds offer broad combinations of fluxing properties for soldering, welding, brazing. Foote's lithium ores are useful in solving slag problems.



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Foote's zirconium metal powder, a highly pyrophoric material, is produced in subsieve particle sizes as "A" and "G" grade product.

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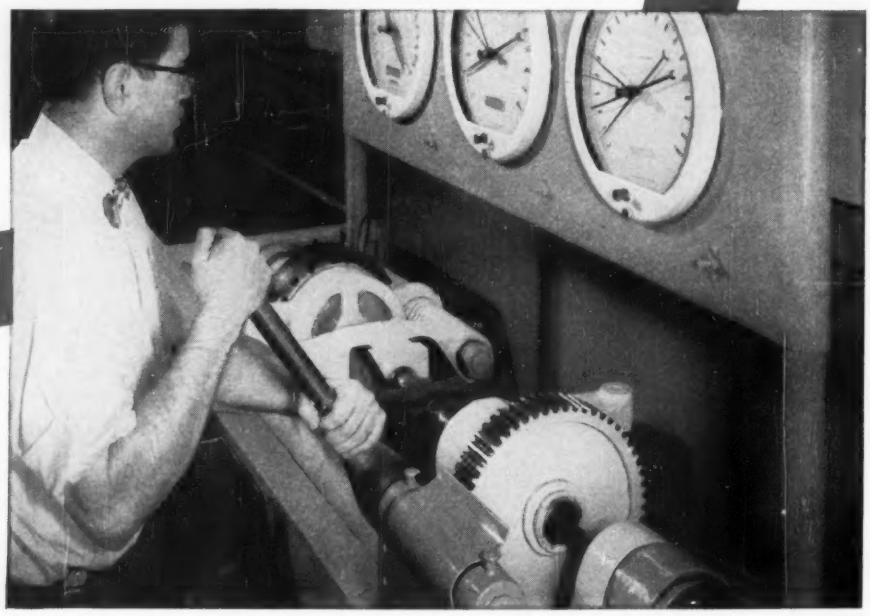
TO PRODUCE QUALITY
SOCKET SCREWS THE H-K WAY—

OUR LABORATORY CONDUCTS EXHAUSTIVE PHYSICAL AND CHEMICAL TESTS WITH THE MOST MODERN EQUIPMENT

Conventional testing isn't enough . . . we subject H-K screws to rigid tests in our TEN-TOR *machine to determine resistance to both tensile and torque stresses. Because we test the finished screws and not just material, you can be sure every H-K Socket Screw will stand up under the toughest application.*



For the finest in socket screw products . . . for unmatched SAME-DAY SERVICE—the name to remember is Holo-Krome. Write for free catalog and technical information.

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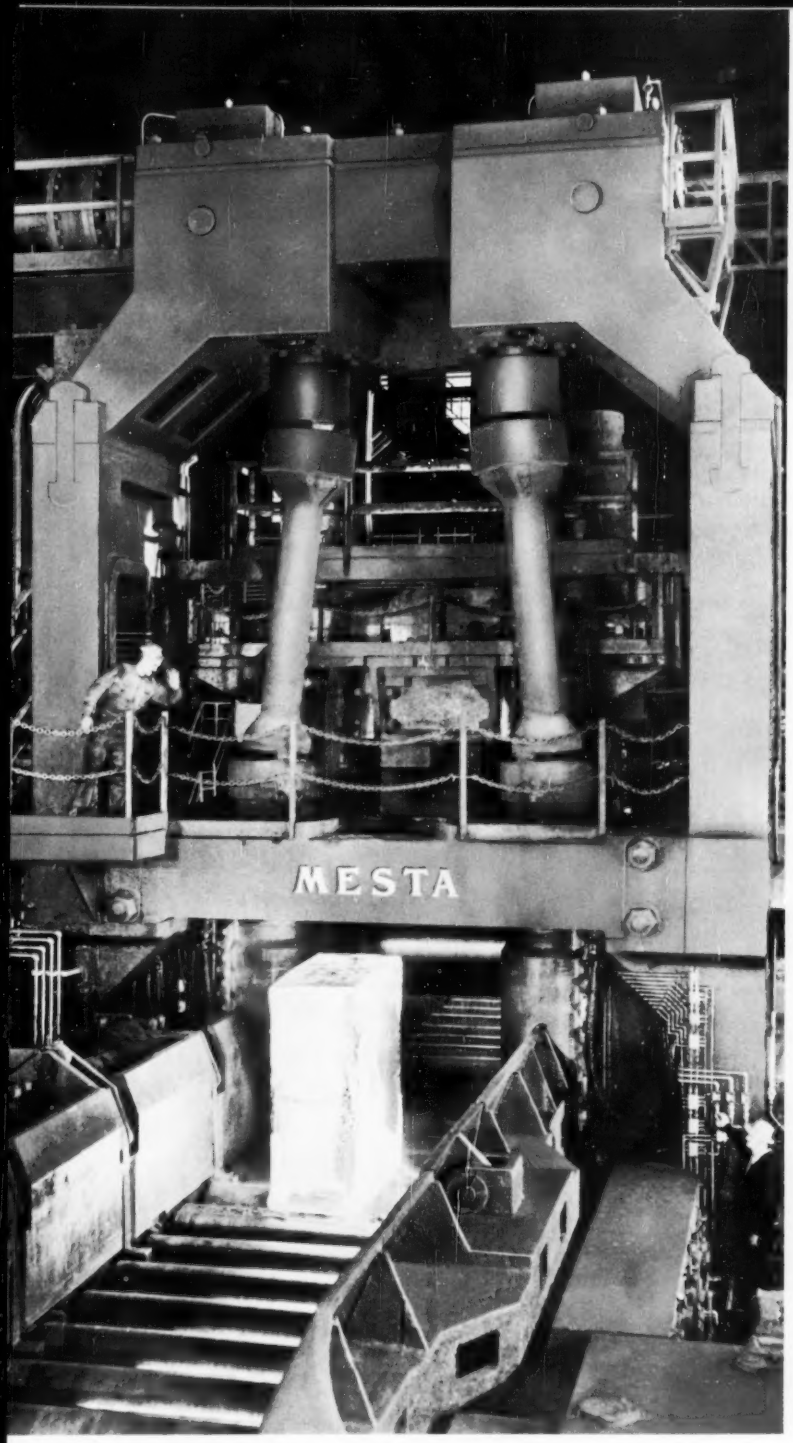


Experienced engineering and development

KEY TO HIGHER TONNAGE

...with Westinghouse-equipped reversing mills

Knocking down an ingot on schedule places heavy demands on your primary reversing mill. Drives and auxiliary equipment take rough abuse. To give you an edge in meeting demands, Westinghouse drives are engineered from long experience. New advances in Westinghouse automatic controls and coordinated auxiliary equipment keep your mill on schedule. MP-3051

YOU CAN BE SURE...IF IT'S Westinghouse

Dependability is tailor made

Experience tailors each drive

Today, reversing mill drive equipment takes heavier abuse than ever before. Growing operating and tonnage requirements can't be met by yesterday's set of standards. That's why experienced engineering at Westinghouse tailors each drive to the specific mill. In this way, you can be sure of top performance, maximum accessibility to all parts of the drive, and rugged construction quality for reliability today and long into the future.

The Westinghouse reversing mill drive, at right, is a good example. Main drive is a 12,000 hp., 40/80 rpm double-armature twin motor. Edger drive (top) is a 4,000 hp., 60/150 rpm double-armature motor. Time-saving accessibility is provided by: 1) large walk-in endbells, 2) extra space for brush accessibility, both radially and axially, and 3) absence of baffle restrictions between the commutator area and the stator or rotor windings.

Heavy-duty thrust bearings are located at the mill end of the main drive pedestal bearings to permit easy, routine inspections. Removable end-case permits complete inspection and maintenance without disturbing either journal bearing or bearing cap.

Rugged construction of the Westinghouse reversing mill drive incorporates heavy-duty bedplates supported on concrete foundations. Pedestal cap bolts and base bolts extend deep into foundation concrete. Mill-end bearings are supported by massive pedestals using foundation keys. Each armature coil is rigidly and individually braced, front and rear. Armature coil cross connections are securly encased in a steel box at the rear of the rotor and flexibly connected to armature coils.

Oscillotrol (R) thrust oil-damper system effectively damps out rotor oscillations caused by pulses from mill-spindle coupling action on twin-drive motors.

MP-3051

YOU CAN BE SURE...IF IT'S Westinghouse

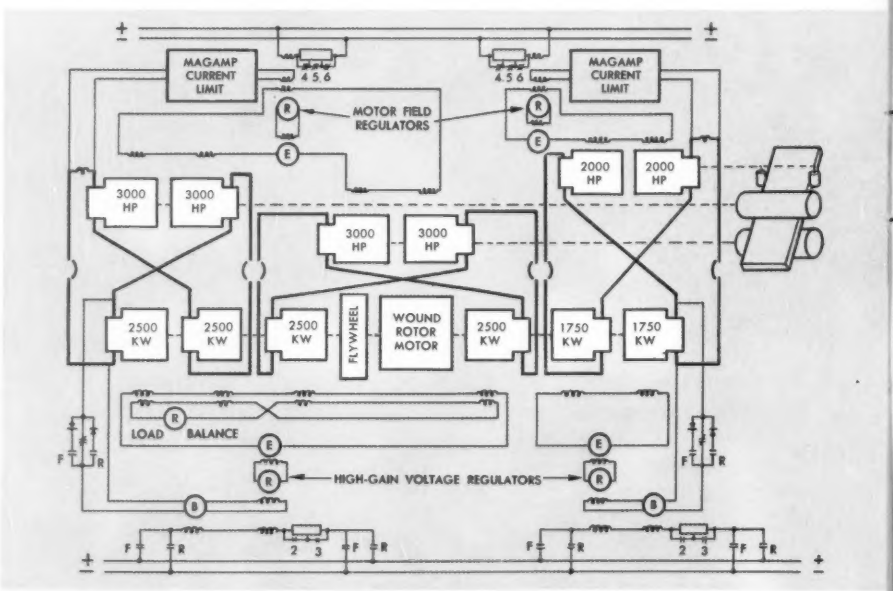
SYSTEM FEATURES

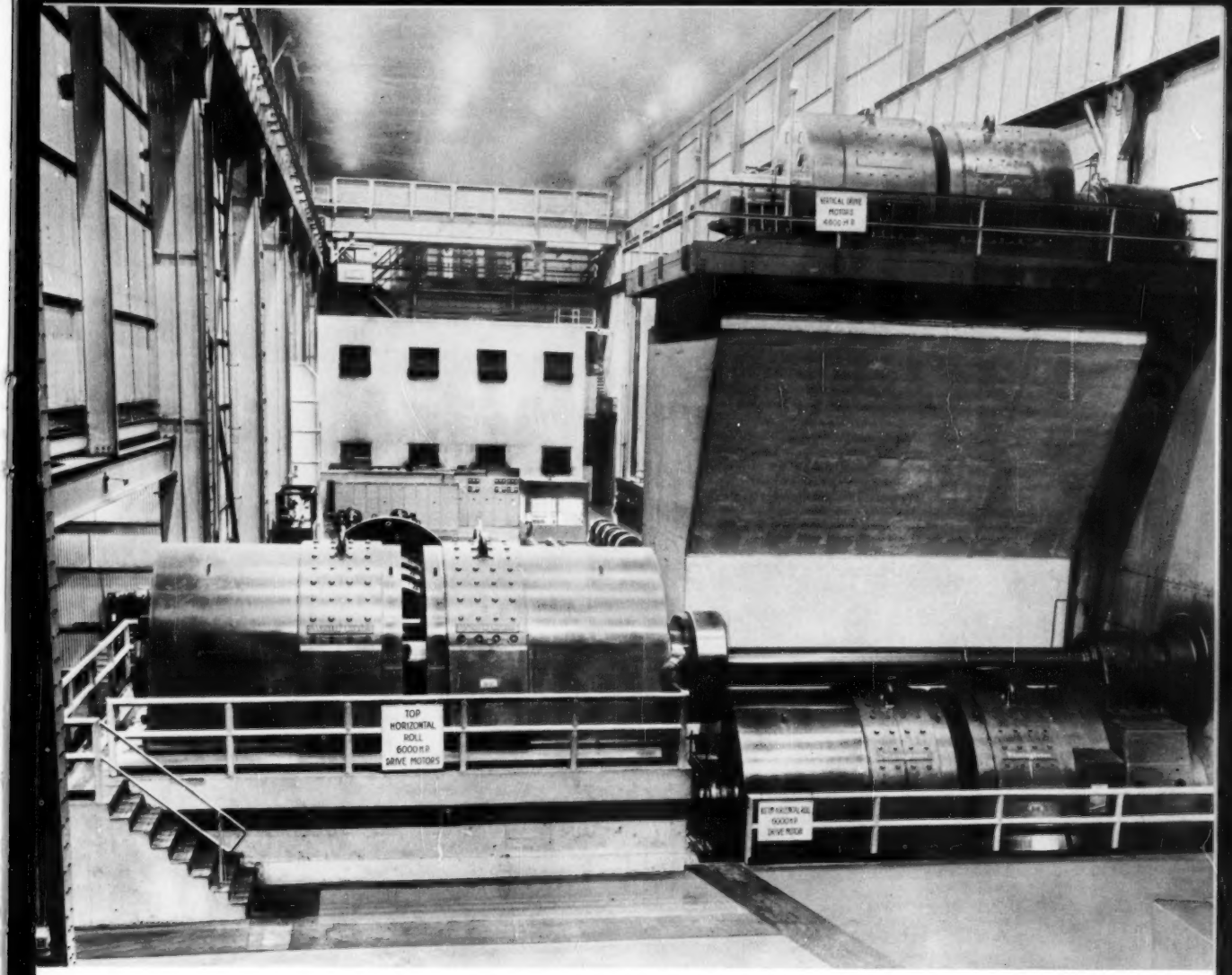
Sandwich series loops are used for each of the pairs of double-armature twin-drive motors and for the double-armature edger motor to minimize the number of circuit breakers and load balance equipment. A load balance regulator excites auxiliary fields on the 2500 kw generators to balance the twin-drive motor loads.

High-gain voltage regulators excite generators to give fast changes in response to the operator's controls.

Motor field regulators excite motors to give changes in speed by motor-field control.

MAGAMP (R) (magnetic amplifier) current-limit regulator builds up motor field strength to increase the torque per ampere for loads approaching 200%.





Typical reversing mill drive using 12,000 hp, 40/80 rpm double-armature twin motor. Edger drive (top) is 4,000 hp, 60/150 rpm double-armature motor.

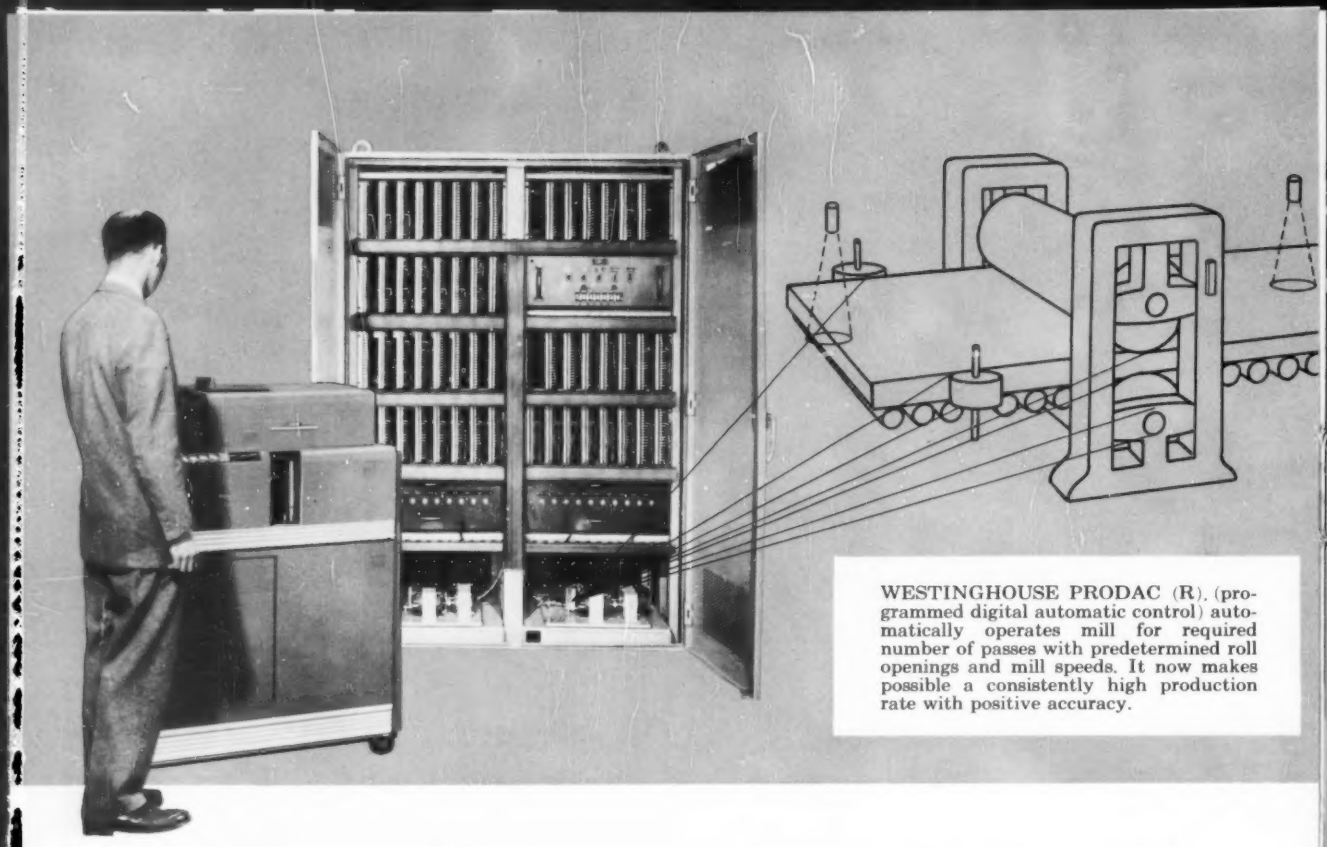
WESTINGHOUSE EQUIPMENT SERVES THESE USERS

YEAR	CUSTOMER	LOCATION	MILL	HP	RPM
1951	U. S. Steel Corporation	Fairless Hills, Pa.	40″ Blooming Mill	8000*	65/130
1951	☆Sheffield Steel Division	Kansas City, Mo.	32″ Blooming Mill	4000	60/150
1951	Laclede Steel Company	Alton, Illinois	35″ Blooming Mill	5000	60/150
1951	Dow Chemical Company	Madison, Illinois	84″ Reversing Mill	6000	55/156
1951	U. S. Steel Corporation	Morrisville, Pa.	Universal Slabbing Mill	12000*†	40/80
1951	°Great Lakes Steel Corporation	Detroit, Michigan	Universal Slabbing Mill	12000*†	40/80
1953	Reynolds Metals Company	McCook, Illinois	144″ Taper Mill	3000	125/250
1954	Inland Steel Company	Indiana Harbor, Ill.	Wide Flange Beam Mill	7000†	80/160
1955	Aluminum Co. of America	Davenport, Iowa	160″ Slabbing Mill	7000*	30/60
1955	Empressa Nacional Siderurgica	Spain	132″ Plate Mill	7000*	40/80
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Slabbing Mill	10000*	40/100
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	168″ Slabbing Mill	10000*†	30/60
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	110″ Slabbing Mill	6000	30/60
1955	Republic Steel Corp.	Cleveland, Ohio	Universal Slabbing Mill	12000*	40/80
1955	Jones & Laughlin Steel Corp.	Aliquippa, Pa.	Reversing Rougher	6000*	40/100
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Reversing Rougher	8000*	40/80
1955	Crucible Steel Co. of America	Midland, Pa.	Roughing Mill	3500	50/150
1955	Armco Steel Corporation	Butler, Pa.	Reversing Rougher	7000	40/100
1956	U. S. Steel Corporation	South Chicago, Illinois	Blooming Mill	12000*†	40/80
1956	U. S. Steel Corporation	Gary, Indiana	Universal Slabbing Mill	12000*†	40/80
1956	Altos Hornos	Mexico	Blooming Mill	6000*	40/80
1956	Large Eastern Steel Company		Blooming Mill	3000	60/150
1956	Reynolds Metals Company	Listerhill, Alabama	170″ Slabbing Mill	7000*	30/60
1956	Tata Iron & Steel	India	Reversing Rougher	3500*	60/150
1956	Kaiser Steel Company	Fontana, California	90″ Slabbing Mill	10000*	40/100
1956	Olin Mathieson Chem. Corp.	Omal, Ohio	96″ Slabbing Mill	5000	35/70
1956	Empire Steel Corporation	Mansfield, Ohio	Reversing Rougher	5000	50/120

☆Armco Steel Corp. °Division of National Steel Corp. *Twin Drive †Double Armature

MP-3051

Auxiliary equipment takes over more responsibility



WESTINGHOUSE PRODAC (R), (programmed digital automatic control) automatically operates mill for required number of passes with predetermined roll openings and mill speeds. It now makes possible a consistently high production rate with positive accuracy.

Reversing mills are more precise, automatic with Westinghouse auxiliaries

Continued research and development by Westinghouse helps to make your operations more precise and automatic. A recent example is PRODAC control. It makes possible the first completely automatic mill with card-programmed rolling information.

Unmatched Westinghouse engineering for high-tonnage reversing mill operation is at your service . . . from planning to design, installation and start-up. A skilled Westinghouse team will accept unit responsibility and work with you and your consulting engineers.

Contact your Westinghouse sales office for further details . . . Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

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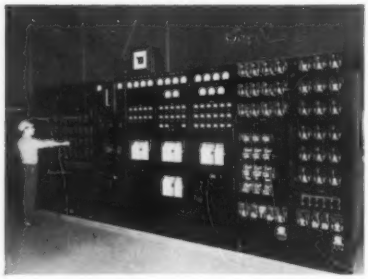
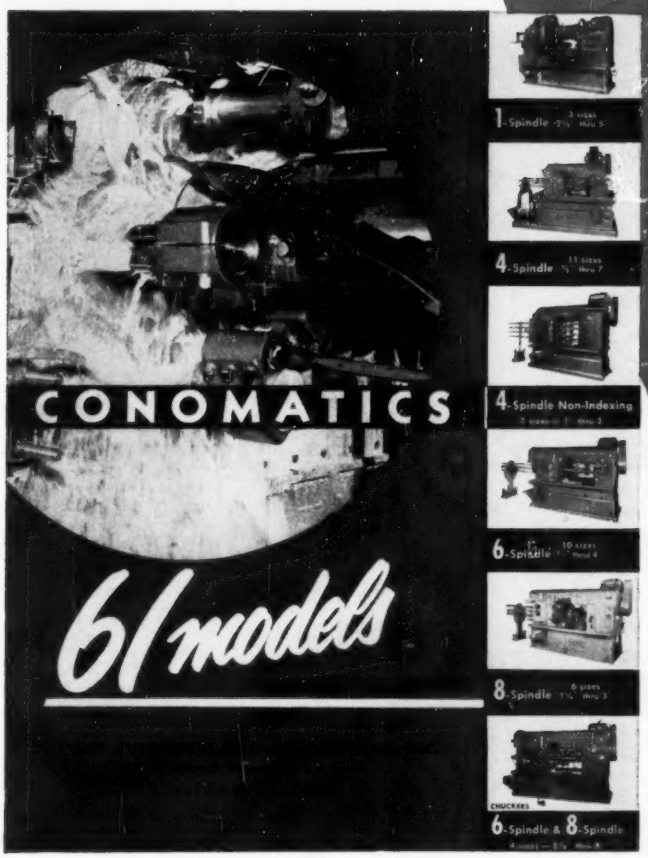


WESTINGHOUSE main-drive control panels provide centralized start-up switches for fans and motor-generator sets, and metering for power and regulating circuits.

WESTINGHOUSE variable voltage control for all auxiliaries minimizes handling time. Transfer switches and emergency bus arrangement afford relief in case of generator failure.

MCT600 INDIVIDUAL TABLE ROLL MOTOR, silicone insulated; drives mill tables directly; in ratings at 230 volts; frame sizes from 604 to 618; 3.75 hp to 50 hp, 157 rpm to 85 rpm.

YOU CAN BE SURE...IF IT'S Westinghouse

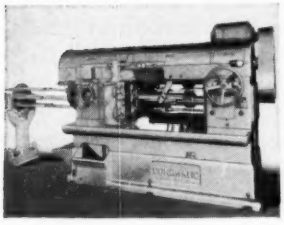


61 models

A machine not put to its best use is theoretically idle. Proper machine selection is an important factor in the profitable use of a multiple spindle automatic. So extensive are the demands on this type of lathe that no single model—or number of models—can be expected to efficiently handle the wide range of work available.

To excel in any range of work a multiple spindle automatic must be specifically designed for that range. That is why CONOMATICS are provided in so many models. In no other way can the purchaser be assured of the best possible machine for his particular requirements.

Write for your copy Today



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

When you can't raise prices, you

for production men

This Avey machine is used in a jet aircraft plant on the West Coast for drilling, boring, and spotfacing the flanges and periphery of a jet engine component.

The two Aveydraulic units mounted horizontally have 12″ ram travel. The third Aveydraulic unit, mounted vertically, has 16″ ram travel and a 6-speed gear box with a speed range of 150 to 1800 rpm. The vertical column has an in and out traverse of 20″; moves to a minimum of 15″ and a maximum bolt circle of 55″.

The 60″ Electrodex table is equipped with a master index ring with two rows of bushings, 96, 49, and 8 indexes respectively. The three heads can be programmed to the indexing of the table.

Another example of how Avey combines standard units to meet special production requirements.

for management

You can close up shop, of course, when your primary customer puts the lid on your price at the point where you run out of profits. You can look for another customer. You can try another market where the customers are more reasonable. But these are all expensive cures.

A more realistic approach is to take preventive action now. For every pound of cure, you can invest an ounce of capital in Avey production machines which can reduce your operating costs immediately. Then you can meet your customer's demands and stay in business.

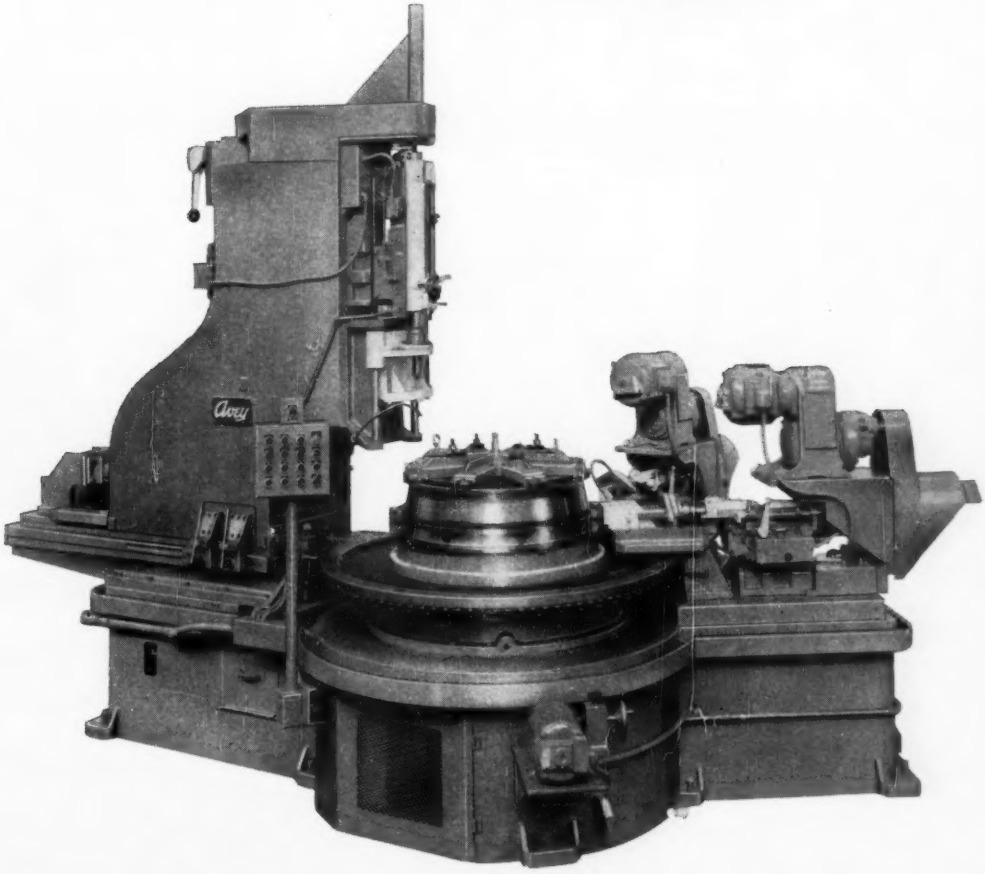
If your replacement reserves are limited, you can finance Avey equipment on a pay-as-you-produce plan. In many cases, Avey machines have returned their original investment so quickly that they earn clear profit within a year.

AVEY DIVISION, THE MOTCH & MERRYWEATHER MACHINERY COMPANY, BOX 625, CINCINNATI 1, OHIO

drilling, tapping, production machines

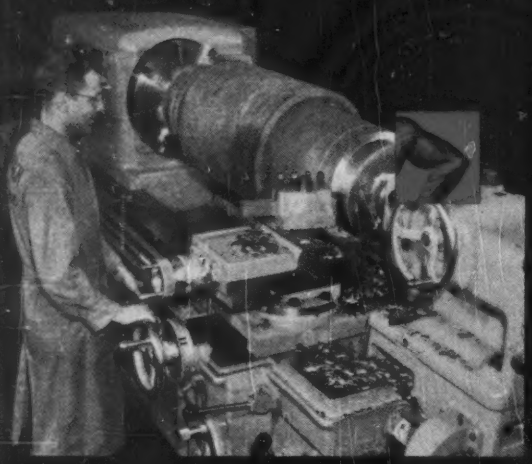
can still make profits

Avey



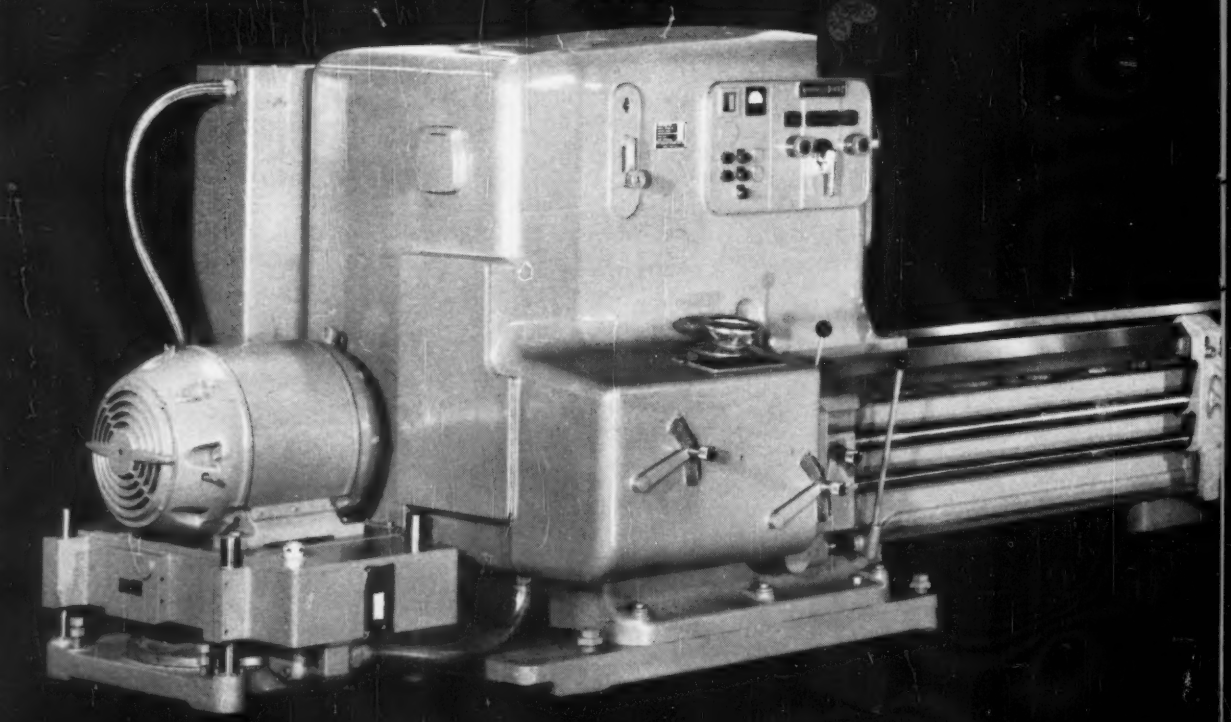
BRAWN

BRAINS



The MONARCH SERIES 90 DYNA-SHIFT HEAVY-DUTY LATHE – Model 2500: Clearance diameter —40″ . . . Swing over cross slide 25″. **Model 2501:** Clearance diameter—44″ . . . Swing over cross slide 31″. **Model 2502:** Clearance diameter—48″ . . . Swing over cross slide 36″.

When progressing from diameter to diameter, speed is changed in a few seconds with the flick of *one* dial. The *machine* calculates each speed and changes speed automatically. And the wide available range assures selection of the *right* speed for the diameter to be turned.



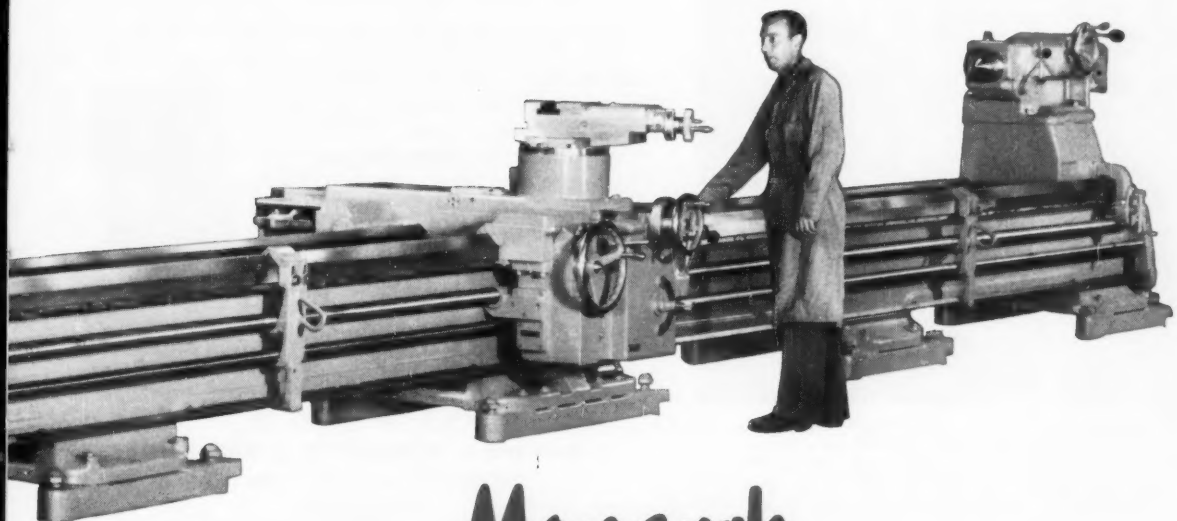
. . The Monarch Heavy-Duty Dyna-Shift

In a class by itself! Just set the work diameter indicator. In a flash, the exclusive Dyna-Shift drive headstock calculates and delivers the ideal spindle speed (36, from 6 to 750 RPM).

You get strength and power to match the brains. The equivalent of 60 H.P. gives this lathe the power to break and the speed to burn any carbide tool. And the massive design supports the heaviest of cuts.

Now, you can use carbide tooling to its ultimate advantage, with metal removal rates up to 120 cubic inches per minute, turning alloy steel. Always used at proper cutting speed, you get the ultimate in productiveness, maximum tool life, and close accuracy.

Here's a machine you've got to know about, and our twenty-four page illustrated booklet #1601 tells you in detail. Just ask . . . The Monarch Machine Tool Company, Sidney, Ohio.



Monarch

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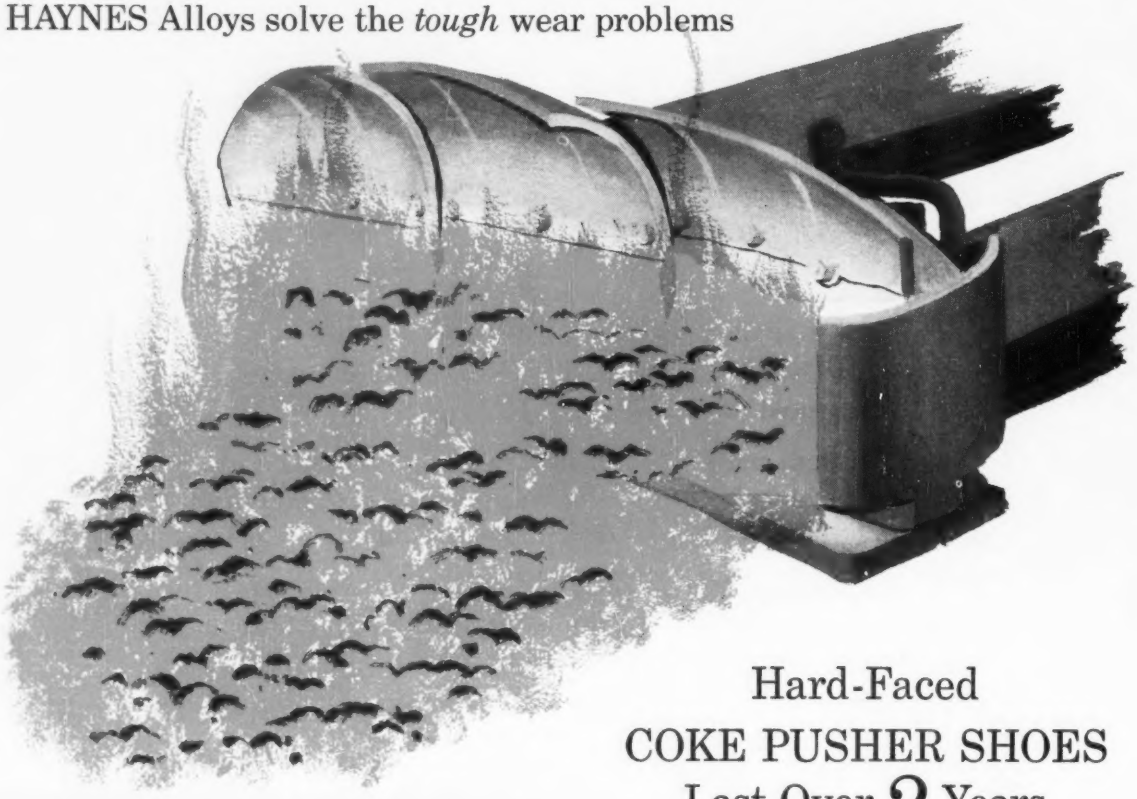
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

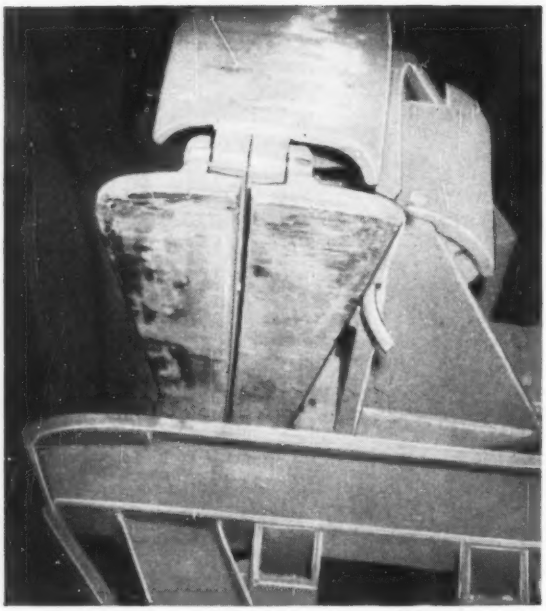
HAYNES Alloys solve the *tough* wear problems



Hard-Faced COKE PUSHER SHOES Last Over 2 Years

Resisting severe abrasion, heat, and thermal shock produced by riding over the coke-covered floor of 1800-deg. F. ovens—these shoes hard-faced with HAYNES STELLITE alloy No. 1 lasted over two years. Ordinary steel shoes wore out in two months.

Whatever your wear or abrasion problem, there is a HAYNES hard-facing alloy especially made to combat it. There are 18 HAYNES hard-facing alloys . . . a wide selection that assures economical protection from the most severe conditions of heat, corrosion, erosion, or wear. For the complete story write for descriptive literature or contact our nearest sales office. HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, General Offices and Works, Kokomo, Indiana.



These shoes, hard-faced with HAYNES STELLITE alloy No. 1, resist abrasion from the coke particles and the lining of the oven floor. The hard-faced deposit does not chip or spall under the thermal shock of returning from 1800 deg. F., in the oven, to ordinary atmospheric temperatures.

HAYNES
ALLOYS

HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

UNION CARBIDE

"Haynes," "Haynes Stellite" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Model 47J Bell Helicopter

Garlock KLOZURES* Specified on Bell Helicopters for 10 years

Since 1947 Bell Helicopter Corporation engineers have consistently specified Garlock KLOZURE Oil Seals for twelve different sealing functions. These KLOZURES serve in both low speed and high speed capacities contributing in no small measure to the outstanding performance and leadership of Bell Helicopters in that industry. Bell reports these seals have a minimum satisfactory life exceeding the required 600 hour overhaul.

The standard sealing element in a Garlock KLOZURE Oil Seal is a unique synthetic material molded to very accurate dimensions. It is non-abrasive, free-running; resistant to oil, grease, heat, and cold; impervious to water, mild acids, and alkalies. It is also extremely durable and resilient. For unusual service requirements sealing elements made of silicone rubber for temperature extremes or Teflon for resisting strong acids and other chemicals can be obtained.

A long list of satisfied users is added assurance that Garlock KLOZURES provide trouble-free bearing protection . . . sealing-in lubricants . . . sealing out abrasive dust and dirt. If you have a sealing problem, why not ask your Garlock representative for his recommendation from "The Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals for every need. The only complete line in the industry.

*Registered Trade Mark

Cross-section of Model 51 Garlock KLOZURE Oil Seal designed for medium-speed rotary service and low pressure reciprocating service. This seal is used in the Transmission Assembly and in the Tail Rotor Gear Box of the 47J Bell Helicopter.

WRITE on company letterhead for new KLOZURE Catalog 20. 79 pages of helpful information on oil and grease seals for bearings.

THE GARLOCK PACKING COMPANY, Palmyra, New York

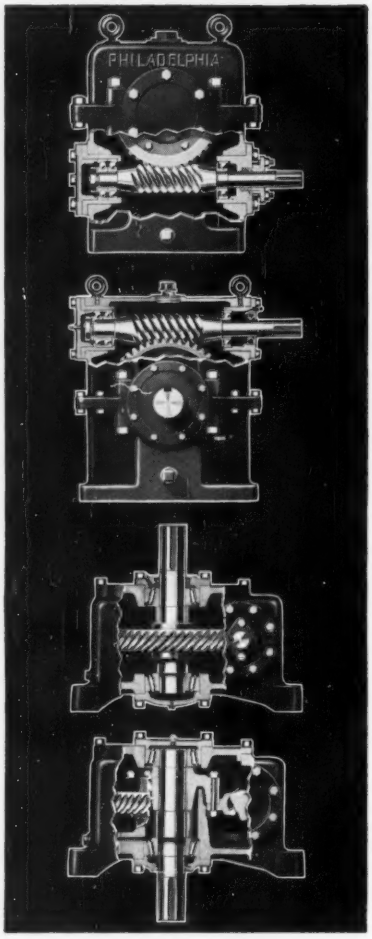
For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

Quality is *inherent*, Service and Long Life *proven*...

Philadelphia WORM GEAR REDUCERS



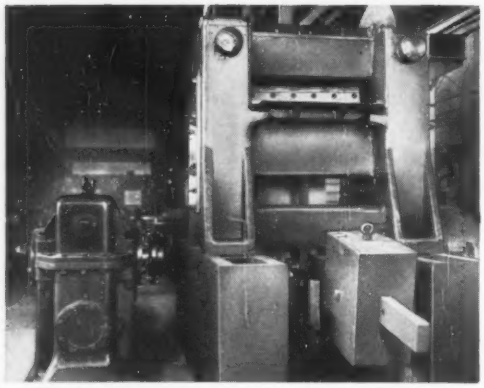
Whether you desire just worm and worm gear sets, or complete self-contained Worm Gear Speed Reducers — Phillie Gear is capable of meeting your most exacting requirements.

Philadelphia Worm Reducers are available in single or double reductions in horizontal right angle drive types, with the output shaft above or below the worm shaft — and in single or double vertical types, with output shaft extending up or down. Standard reductions in the single type are up to 90 to 1, and the double reduction types from 102 to 1, to 6300 to 1.

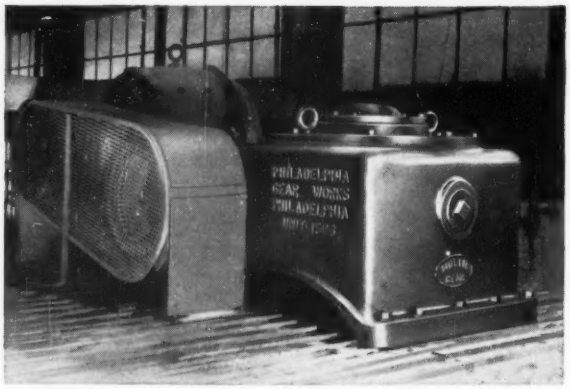
All sizes and types of Philadelphia Worm Reducers provide efficient, smooth and dependable power transmission under the most rigorous and severe operating service — Thousands are in daily use in industry throughout the World.

For detailed information, write for Catalog WG-562, and please use your Business Letterhead when requesting your copy.

a type and size for any requirement



Type AT Philadelphia Worm Reducer driving 44" Up-cut Hot Shear.



Double Reduction type DVT Philadelphia Worm Gear Reducer on special down-shaft application.

phillie gear ®

PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices In all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

Limitorque Corporation • Philadelphia

REDUCE LADLE LINING COSTS *with* HELSPOT

HELSPOT

Slag Resisting Monolithic Lining for Metallurgical Ladles and Furnaces

HELSPOT—"tried and proven" super quality plastic firebrick—will reduce ladle lining costs, improve pouring operations and minimize metal contamination. Highly refractory graphite, chemically sealed into the mix, gives HELSPOT lining a smooth, "self-lubricated" surface which permits easy metal flow and prohibits metal penetration. The formation of skulls is practically eliminated in HELSPOT-lined ladles. Slags do not build up on the slick graphite surface; less time is required for cleaning, repairing or relining ladles.

A Super-Duty Fire Clay base assures maximum resistance to spalling and cracking. HELSPOT lining will withstand the most severe thermal shock. HELSPOT comes, ready to install, in 100-lb. cartons and 500-lb. drums.

127

HELSPOT
LADLE WASH
A finely ground material with a graphite base, recommended as a final coat for any ladle lining. It seals drying-in cracks, replaces surface loss through oxidation, produces a smooth, even lining surface. In 100-lb. bags, add only water, mix; easily applied with brush.

MEXICO REFRACTORIES COMPANY
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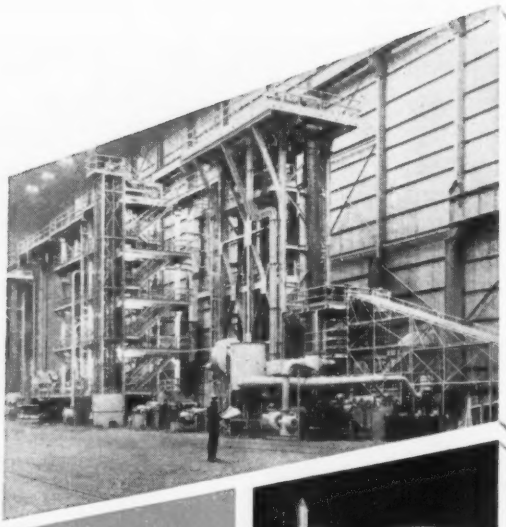
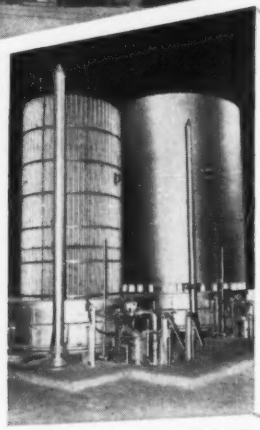
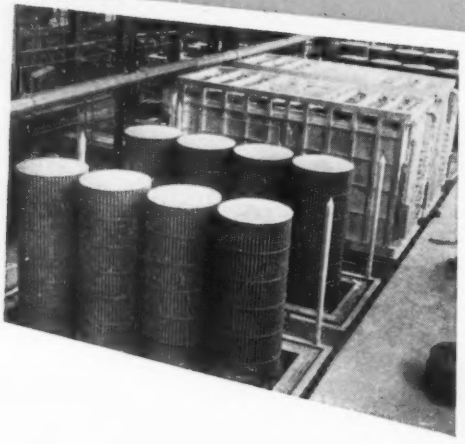


VERTICAL STRIP ANNEALER



SINGLE-STAND ANNEALERS

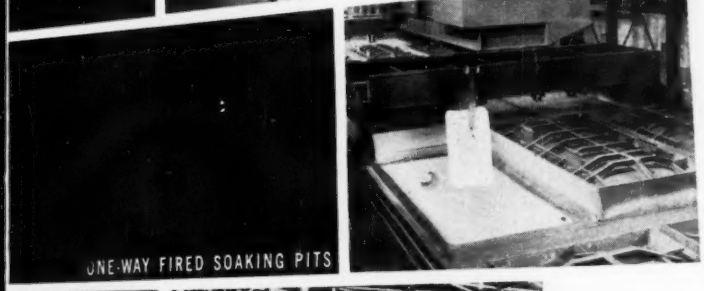
CONTINUOUS STRIP GALVANIZER



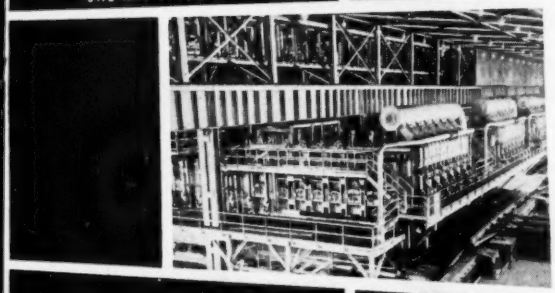
MULTIPLE-STAND ANNEALERS

foundation for steel mill profits

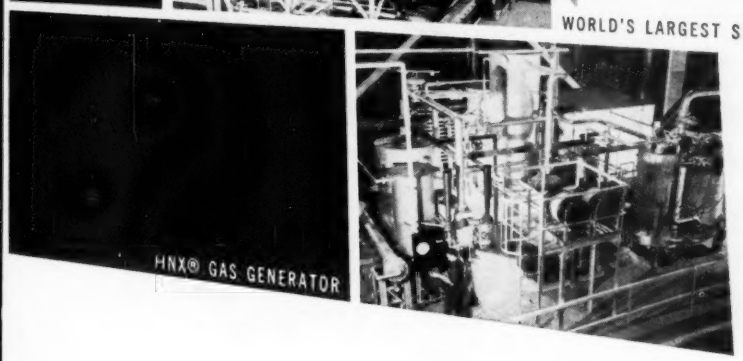
CARBOTTOM COVER FURNACE



ONE-WAY FIRED SOAKING PITS



WORLD'S LARGEST SLAB HEATER



HNX® GAS GENERATOR

You put a solid foundation under your profits whenever you specify Surface equipment. Whatever type it may be, you know it is supported by many interlocked blocks of know-how in heating and handling steel.

The technical skills which Surface has developed in building soaking pits will benefit the man who buys Surface annealing covers. In the same way, Surface concepts of slab heating contribute to high-speed stress relieving . . . carbon restoration to strip annealing . . . controlled atmospheres to wire patenting.

Because of this broad and deep foundation of experience, Surface can improve any single process in the context of a complete sequence of operations. This is to the customer's profit, as many companies will confirm.

Surface Combustion Corporation, 2408 Dorr St., Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

Surface®

wherever heat is used in industry

ASSOCIATED COMPANIES: British Furnaces, Ltd., Chesterfield • Stein & Atkinson, Ltd., London • Stein & Roubaix, Paris • S. A. Belge, Stein & Roubaix, Bressoux, Liege • S. A. Forni Stein, Genoa • Chugai Ro Kogyo Kaisha, Ltd., Osaka • Benno Schilde Maschinenbau, A. G., Bad Hersfeld

Roebling Royal Blue Wire Rope will **bend** and **bend** and **bend!**

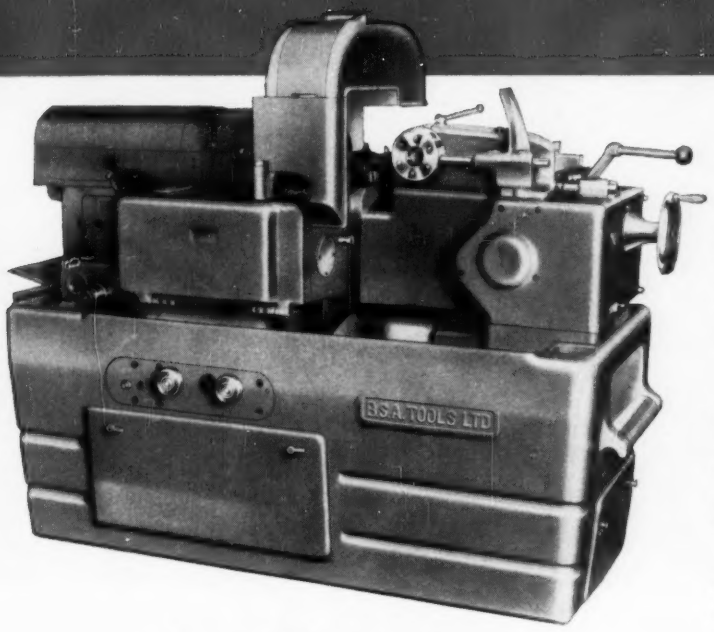
What's more, Roebling Royal Blue is *stronger* than the strongest wire rope previously available. It will do more work and last longer on *your* job. Call your distributor or your nearest Roebling office for full information about Royal Blue, the really better wire rope. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Distributors, Branches and Warehouses Throughout the Country—Subsidiary of The Colorado Fuel and Iron Corporation

BSA first to provide UNIT REPLACEMENT of parts subjected to most wear

to keep important production flowing with new machine performance



With speeds, machining accuracy, ease of tooling and operation and maintenance equal or superior to any machine in its classification, BSA Single Spindle Automatic Screw Machines offer a very definite plus value through *"unit construction and replacement"* of work spindles, side slides, turrets and gear boxes.

Unit construction, plus extremely rigid, one-piece machine frame makes it possible to bring BSA machines back to factory standards of perfection quickly. You place an important unit back in the line with a minimum of lost production.

Shipment of replacement parts are speeded to you from National Acme, in Cleveland. Here, also, full engineering and design services as well as demonstration and service facilities, in the National Acme tradition, are available to you.

May we explain how *"unit construction and replacement"* can ease your production problems?

Additional Production Advantages of BSA

FIVE STANDARD CAPACITIES: ½" ¾", 1", 1⅝", and 2".

WIDE RANGE OF SPINDLE SPEEDS—200 to 6000 on ½" machine, 69 to 1260 on 2" model.

Cams, change gears and tooling easily accessible FOR QUICK JOB-TO-JOB CHANGEOVER.

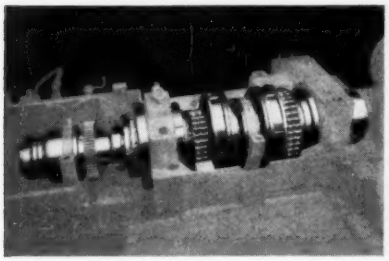
Unit construction provides quick access for EASY MAINTENANCE.

Special spindle mounting, DESIGNED TO REDUCE WEAR.

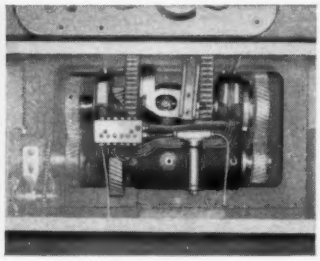
Positive chain drive from gear box to spindle PREVENTS SLIPPAGE.

All models use STANDARD AMERICAN TOOLING

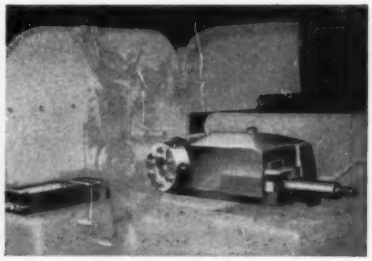
UNIT CONSTRUCTION SPEEDS REMOVAL OR REPLACEMENT



Work Spindle



Gear Box

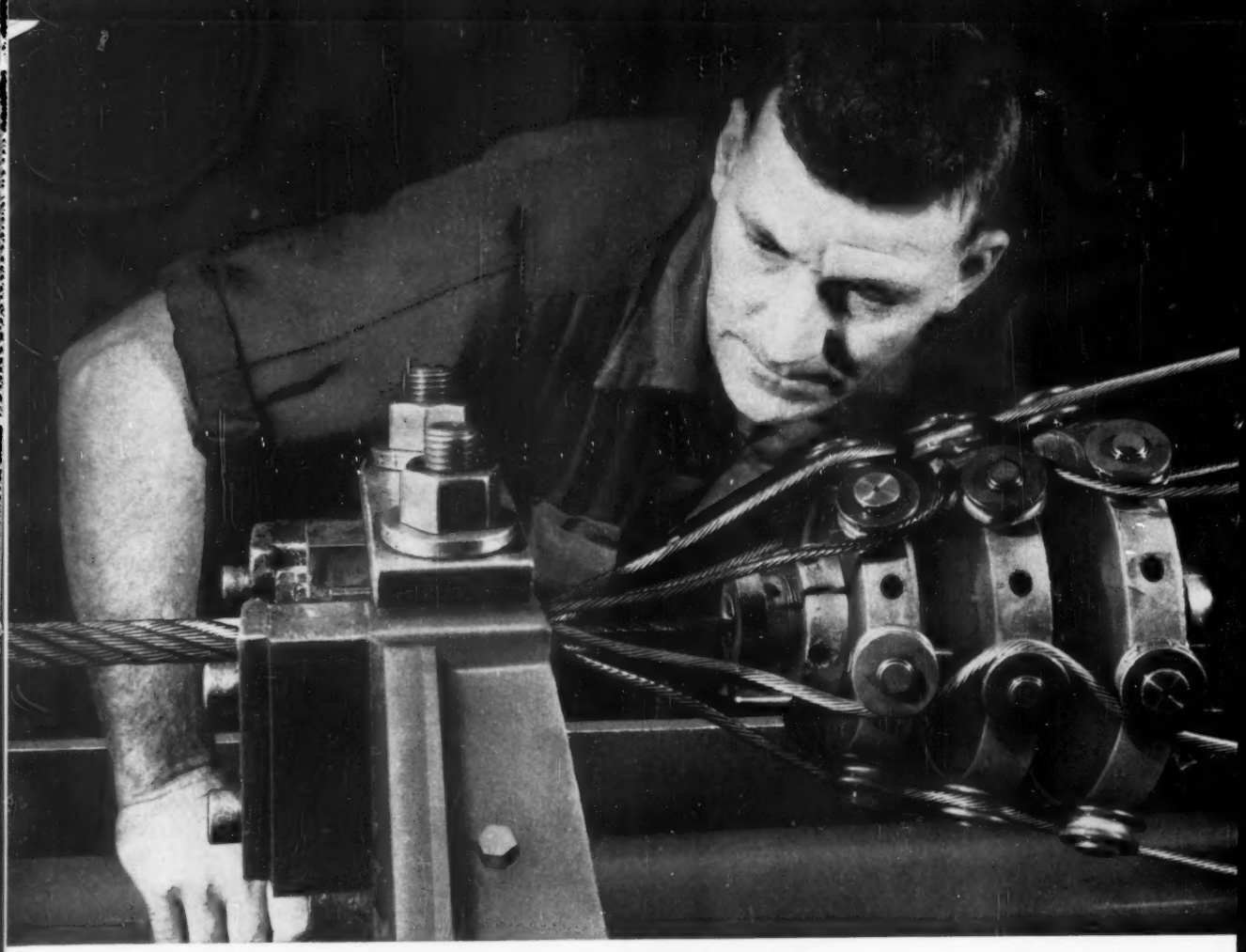


Side Slides and Turret

Distributed and Serviced in U.S.A. by...

National Acme

THE NATIONAL ACME COMPANY, 189 E. 131ST ST., CLEVELAND 8, OHIO • Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.



At the closing die on a wire rope closing machine, strands are pre-formed by rolls into the shape they will have in the finished rope. In the operation at right, strands are closed into finished rope.

Pittsburgh Steel Does A Job . . .

Where Wire Takes A Beating

Quality of Pittsburgh Wire in Rochester Ropes Protects Lives

Wire rope manufacturers just don't take chances on quality.

They can't afford to because their ropes have such vital jobs as protecting human lives and withstanding corrosive sea water for long periods.

The wire rope manufacturing process itself requires a wire of superior strength. Look at the photo above. Imagine the machine pictured is revolving at high speed as it preforms wire strands to a helical shape before the strands enter the closing die. In this process uniformity in the wire is essential to accurate preforming.

All requirements of rope makers for wire are exacting. You can be sure a wire mill which consistently meets those requirements is a good bet to produce other types of wire of high quality.

Go into the plant of one quality-conscious wire rope manufacturer—Rochester Ropes, Inc., of Culpeper, Va.—and you will see these requirements being met by wire from Pittsburgh Steel Co.

Even before manufacturing starts, Rochester Ropes, Inc., tests every coil of incoming wire to make sure the finished rope will give long service on tough jobs. Here's what the tests measure:

- **Torsion strength** which gives wire the ability to take repeated twisting action, both on the rope-making machines and in service.
- **Freedom from seams, inclusions and varying degrees of hardness** assures the wire rope user that no individual wires in the rope are likely to break under sudden or heavy strains.
- **Tensile strength** gives wire its work-horse qualities. The basic strength of wire rope comes from its tensile strength, the wire's ability to pick up a heavy load and to last for years in the field.
- **Zinc coatings** are tested to make sure the covering of protective metal is uniform and adequately thick. Wrapping tests make sure zinc won't flake off when a hawser scrapes against a wharf or that it won't peel when twisted around a stanchion.
- **Toughness** shows up better in the field than in the laboratory. Toughness is the quality which results from proper grain structure, from uniform dimensions which as-

(Advertisement)

Every coil of rope wire shown here before rewinding on bobbins for use on stranding machines is carefully tested. In the background are stranding and closing machines in the Rochester Ropes' plant.

sure even wear on the rope and from the skill with which wires are twisted into strands and strands into finished rope.

Finished wire rope undergoes another series of tests which make certain every coil of rope leaving the Rochester plant will do the specific job for which it was built.

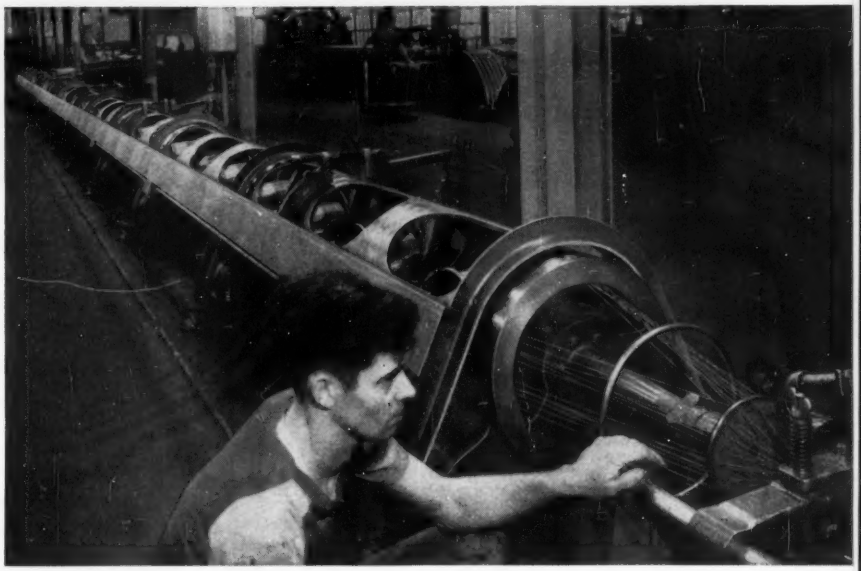
Pittsburgh Steel's rope wire, by making good in Rochester Ropes' laboratories, production machines and in the field, proves to all kinds of wire users that Pittsburgh Wire can be depended on for high, uniform quality.

"The quality of our wire rope starts with the wire we buy," said William L. Rochester, Jr., vice president in charge of sales at Rochester Ropes. "The quantity of rope wire we buy from Pittsburgh Steel speaks for the regard we have for its wire."

Whether you use oil tempered spring wire, aircraft wire, brush wire or any other kind of manufacturers' wire, you can enjoy the advantages that are built into rope wire.

Pittsburgh Steel wire will help you make a better product, lower operating costs and provide greater customer satisfaction.

Investigate these opportunities today. A telephone call to any of the district offices listed at right will bring skilled engineering help to you immediately.



Forty-one bobbins pay off wire on this 120-foot long stranding machine in the Culpeper, Va. plant of Rochester Ropes, Inc.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

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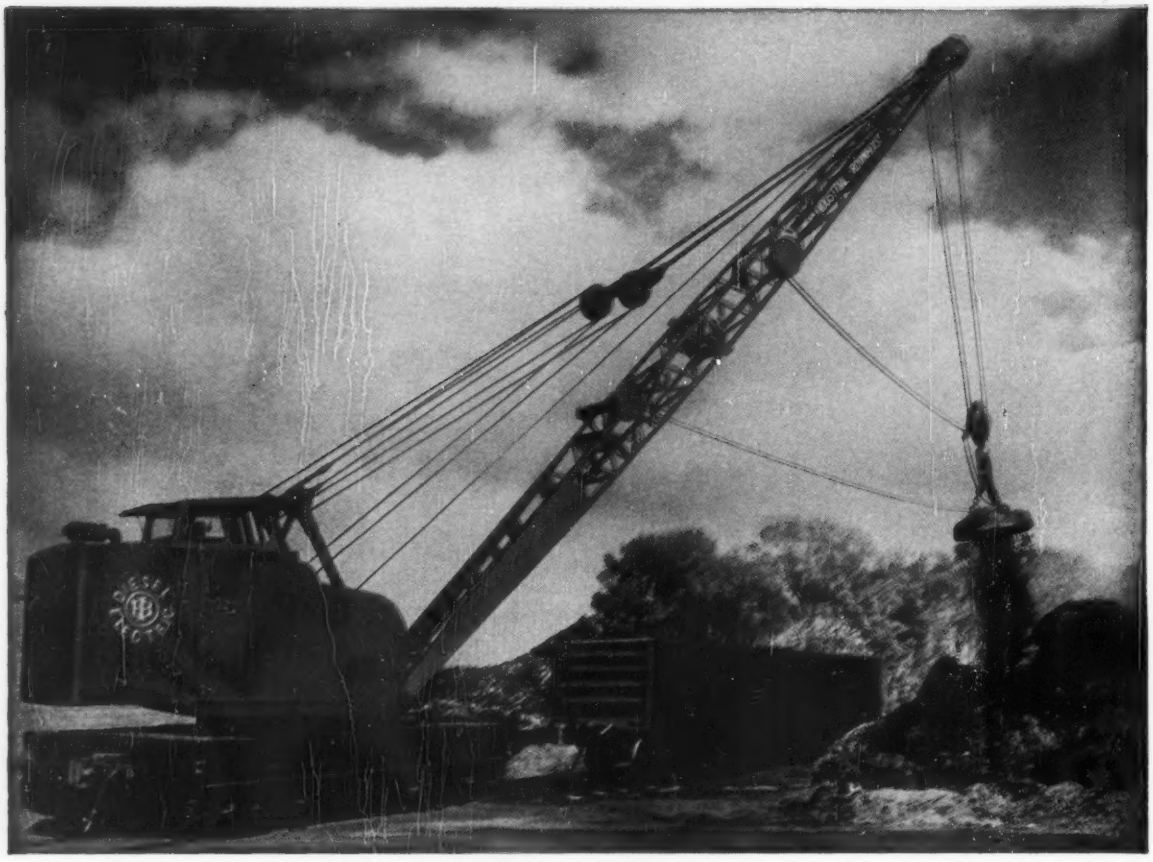

With magnet hook or bucket... BROWNHOIST speeds the job

Brownhoist Cranes are helping maintain high production schedules in mines, steel mills, factories, and scrap yards . . . in fact, wherever there are railroads throughout the world. Brownhoist Diesel-Electric Locomotive-Cranes, for all their husky size, handle easily. Their patented Monitor Type Cab and Clear-Vision Boom give a 360° view. Operating controls are within easy reach. Electric travel permits operation as a switch engine as well as a crane. Constructed to last for many years with little maintenance. Brownhoist Diesel-Electric Cranes are available in capacities from 25 to 100 tons. For complete information, consult your nearest Brownhoist representative or write us today.

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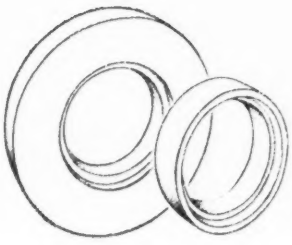
BROWNHOIST

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

SUBSIDIARY OF Penn-Texas

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN DISTRICT OFFICES: New York, Washington, Pittsburgh, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

Jim Lewis, of W. Lewis Sales Co., Cleveland, typical Bay State distributor, says," I try to figure out how I'd meet my customers' payrolls and still make a profit. That way I get ideas I'd never have if I just concentrated on my own selling problems."



The "hole" on the right is all they throw away now.

He put one wheel to work on two machines!

Ed and John Menhart, of Cleveland's Micro-Plane, Inc., were well satisfied with the 24" x 4" x 12" Bay State wheels on their big Hanchett horizontal surface grinder. They were the only wheels they'd found in 8 years that could handle the tremendous variety of work that went through their shop.

But . . . because surface speed dwindled as the wheels wore down, grinding efficiency naturally dropped, too. This bothered Jim Lewis, the Bay State distributor who specified the wheels, because he hates to see his customers throw away "anything but the hole" in a grinding wheel.

Lewis got together with the people in Bay State's Cleveland office and figured out a solution. At their suggestion, Micro-Plane adapted a smaller Hill-Acme surface grinder that not only put the half-used wheels efficiently and profitably to work but also substantially reduced wheel costs because they no longer had to buy wheels for the Hill-Acme.

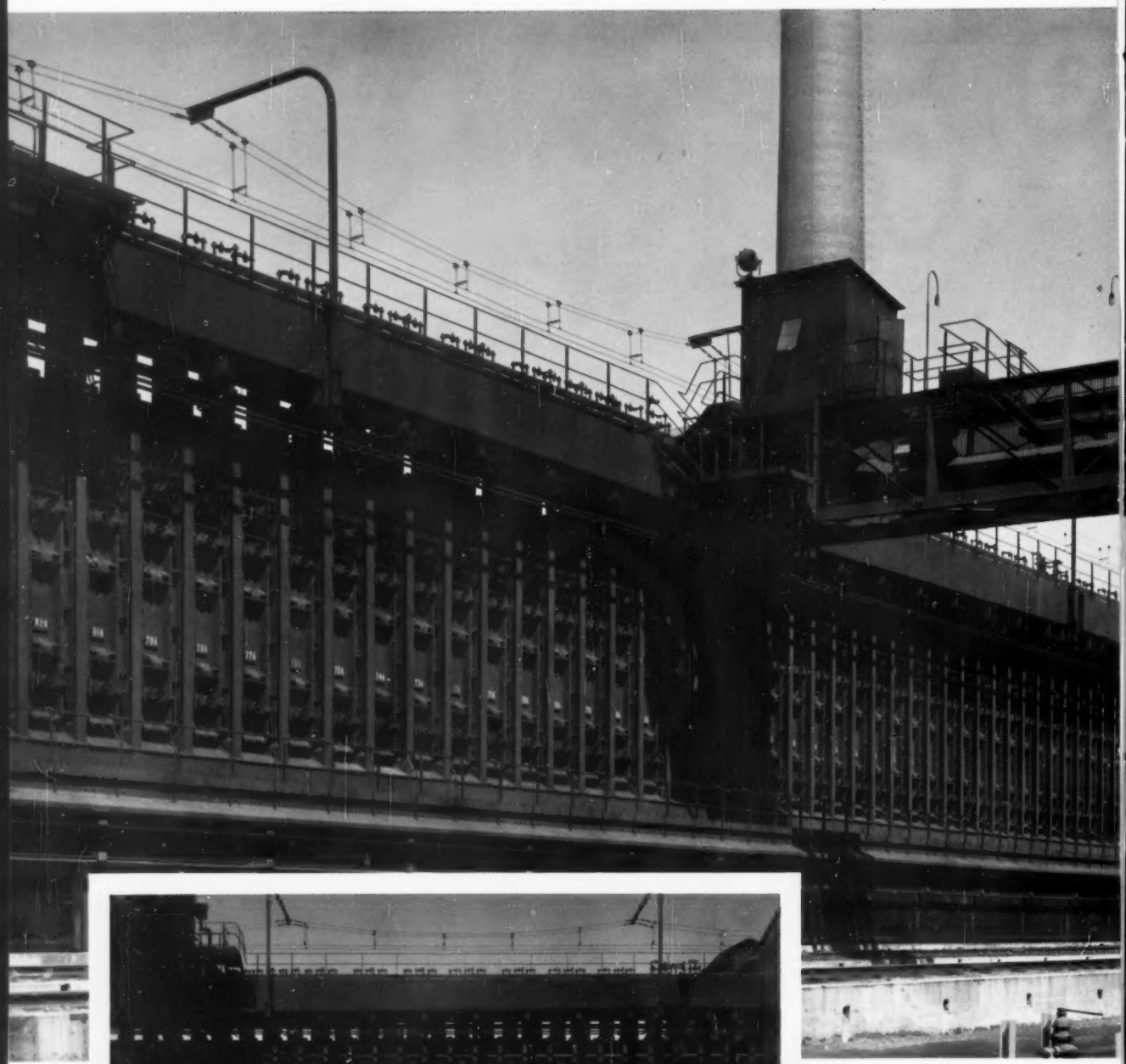
If you would like to supplement your engineering staff with an abrasive specialist like Jim Lewis, you'll find it well worth your while to talk to the Bay State man in your area. He's trained to find *practical, profitable* solutions to your grinding problems.

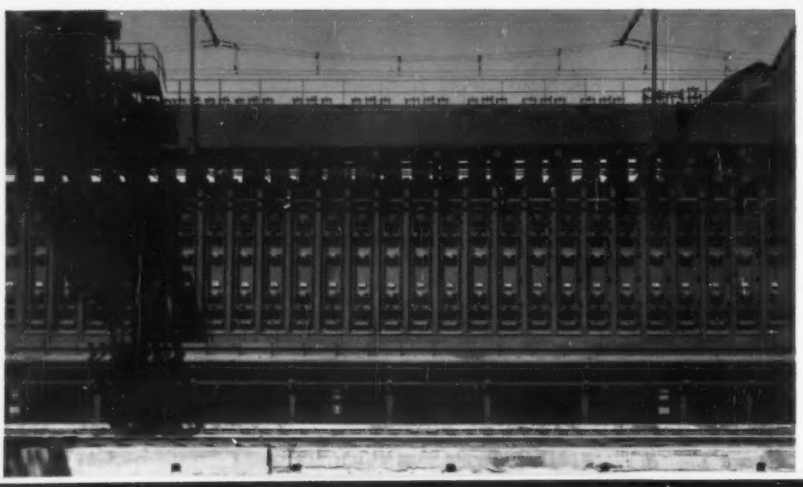
BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
Branch Offices and Warehouses: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. *Distributors:* All principal cities. Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ontario.

Repeat order for Koppers Youngstown Sheet & Tube





Battery No. 4—is shown in these photos of the Coke Plant at Youngstown Sheet & Tube's Indiana Harbor Works.

Coke Ovens at the Company

Dependable service from existing battery leads to purchase of 75 more Koppers Ovens

BATTERY NO. 3, consisting of 75 Koppers-Becker Underjet Coke Ovens, was put into operation in 1952 at the Indiana Harbor Works. In 1955, Youngstown required additional coke-making facilities, and chose Koppers to design and construct a new battery, which is a duplicate of Battery No. 3.

2,000 net tons per day

The new Koppers battery went into operation late in 1956. Its 75 ovens carbonize approximately 2,000 net tons of coal per day. Oven walls feature Koppers patented and highly regarded Hammerhead construction. Recirculation of waste gas insures uniform heating, cuts down fuel consumption, and eliminates any need for decarbonizing equipment—an important saving.

Coke oven or blast furnace gas

Now underfired with coke oven gas, the new battery can later be fired with blast furnace gas if desired. This construction, which permits both types of gas to be used, was first developed and introduced by Koppers.

Koppers accustomed to repeat business

Koppers has built the majority of coke ovens in the United States. Much of this business, like the new battery for Youngstown Sheet & Tube, is *repeat* business—the kind you get only if your product has given satisfactory service.

We think this is a good reason for *you* to specify Koppers—not only for coke ovens, but for all other steel-plant installations. Koppers brings you 50 years of service and experience. The Coke Plant, Freyn, and Chemical Departments have done work on nearly all types of steel-making equipment. Write or call for information. Koppers Company, Inc., Engineering and Construction Division, Pittsburgh 19, Pennsylvania.

KOPPERS®

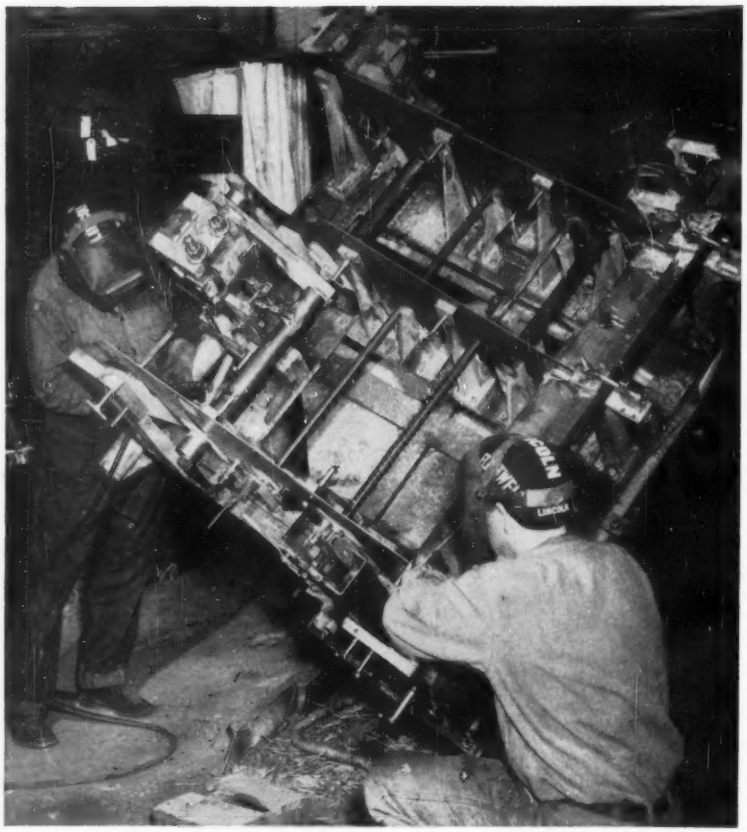
KOPPERS

ENGINEERING AND CONSTRUCTION

Any Welding Job
AC or DC can
be handled with
one machine

That's why it pays
to standardize on

LINCOLN
IDEALARC



This job required DC welding . . . The next job needed AC.

WITH Lincoln Idealarcs you can schedule any welding job on any machine. You can take any machine to any job. You can do these things because every Idealarc can give you both AC and DC welding current . . . whichever is best for the particular job.

Hadn't you better standardize on Idealarc? Write for Bulletin SB-1343 and SB-1364 for facts.

Idealarc AC/DC Welder available in 180, 250, 300, 400, 500 amp. sizes.

THE LINCOLN ELECTRIC COMPANY
Dept. 1631, Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment

When one welder IDEALARC
Has both AC and DC
Yet costs less to buy and operate

WHY use anything but IDEALARC

it's **easy** now

to recognize

superior quality

brass and aluminum

bearing this trademark identification

bring out the ***BEST*** *in your fabricated products*

SCOVILL

SCOVILL MANUFACTURING COMPANY
MILL PRODUCTS DIVISION, 99 MILL ST.
WATERBURY 20, CONN. PHONE PLAZA 4-1171

Identify your products

with the finer quality of

SCOVILL

BRASS and ALUMINUM

Many specific betterments are inherent in Scovill-pioneered production techniques, such as CONTINUOUS CASTING. Others result from the very broad scope of Scovill facilities . . . among the largest and most modern in the industry. Still others stem from important advances in precision control of alloy composition, temper and grain size, physical dimensions and finish.

When you use brass and aluminum in your shop bearing the unusual Scovill brand identification, you can be sure of its uniformly superior quality . . . lot after lot . . . order after order . . . made better to . . .

bring out the BEST in your fabricated products

Scovill Manufacturing Company, Mill Products Division, 99 Mill Street, Waterbury 20, Connecticut Phone Plaza 4-1171.

6SC57

Who SAYS we're not interested in partnership insurance?

"Of course we are! We know the futures of our families may well depend upon it."

The death of a partner means far more than the loss of a close friend. By law, it means the complete dissolution of the partnership organization which brings business activity to a complete standstill.

This can mean financial chaos to the business and extreme hardship to the families involved.

BUT . . . an Ætna Business Life Insurance Plan can prevent this . . . can provide in advance for a smooth and orderly transfer of the business.

ÆTNA BUSINESS LIFE INSURANCE PLANS ARE SPECIALLY DESIGNED . . .

- **To protect PARTNERSHIPS against liquidation or reorganization.**
- **To protect SOLE PROPRIETORSHIPS for heirs or selected employees.**
- **To protect CLOSE CORPORATIONS from forced reorganization.**
- **To cover the loss of a KEY MAN in any organization.**

Add Life to your Business with Ætna Business Life Insurance

ÆTNA LIFE
INSURANCE COMPANY

Affiliates:
ÆTNA CASUALTY AND SURETY COMPANY
STANDARD FIRE INSURANCE COMPANY
Hartford, Conn.

Ætna Life Insurance Company
Hartford 15, Connecticut

Gentlemen:

Please send me a copy of your new booklet "Will This Man Take Your Business With Him When He Dies?"

Name_____

Address_____

_____

Simplicity Model S-200 Asphalt Plant recently delivered to Ben M. Hogan & Company, Little Rock, Ark. This is Hogan's fourth Simplicity Plant, and is producing well over 100 tons of asphalt mix per hour.

"4 times around the world—that's how far we estimate a Standard Steel ring will travel as an integral part of a Simplicity Asphalt Plant"

"In 40 years of service we estimate that a bull gear and tire on the rotating dryer drum of a Simplicity Asphalt Plant travels at least 100,000 miles to make four million tons of asphalt without defecting. These and other components of our asphalt plants are forged by Standard Steel Works.

"But we are not only justly proud of the durability of our products, thanks in part to Standard, but also of the service we render our many customers—both in terms of delivery and of maintenance. And that's where Standard Steel Works is of greatest value to us. A special delivery arrangement with Standard Steel Works, plus their personalized service, helps us maintain superior service to our customers."

Frankly, we feel we deserve this fine compliment from Mr. Whitfield. We know how important it is for *our* customers to keep *their* customers satisfied. That's why we take a special interest in their needs and keep letting our men in the shop know the importance of the role they play in helping our customers maintain a favorable competitive position.

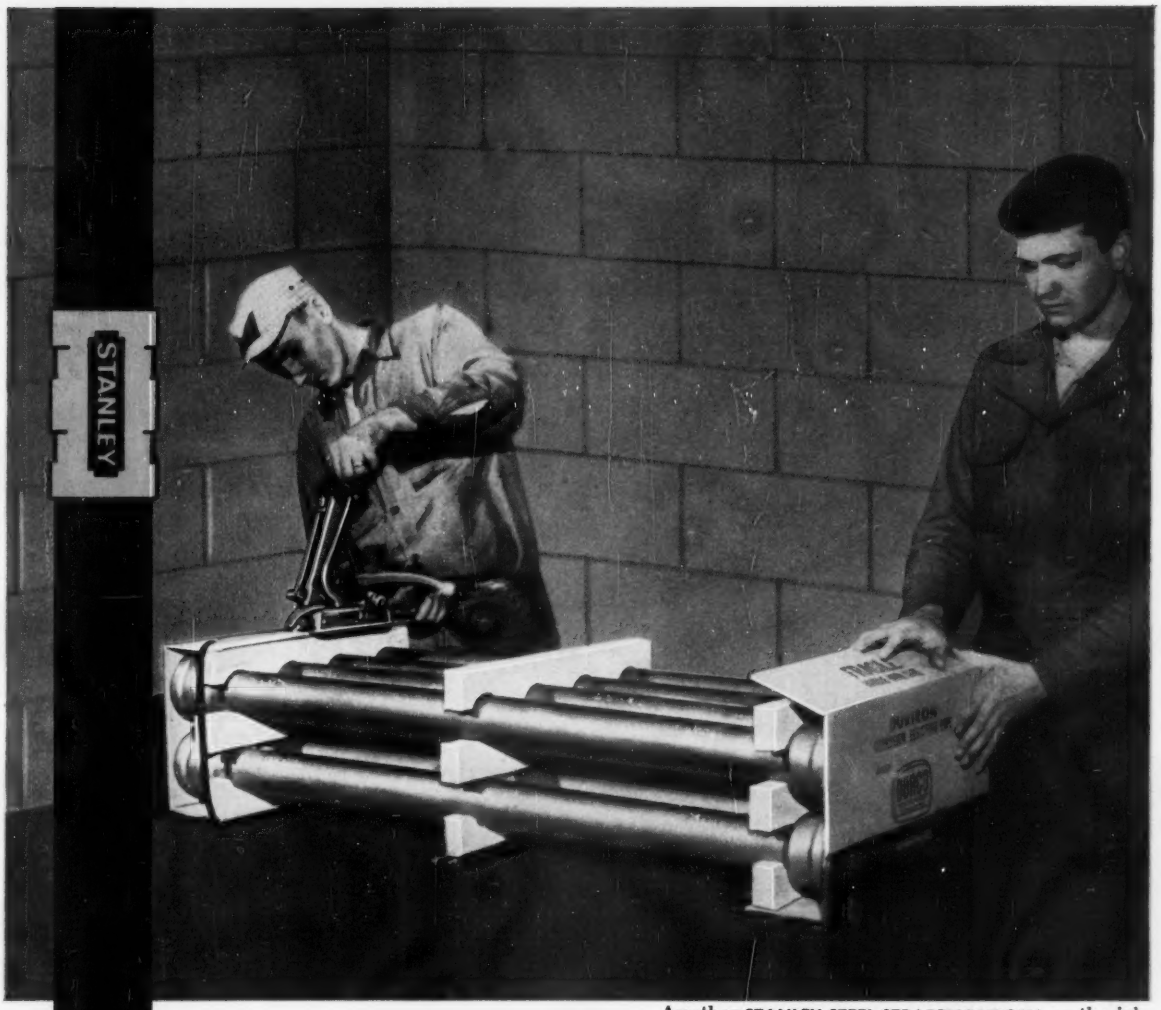
Why not invite us to discuss your casting, forging and weldless ring needs with you. It won't cost you anything, and we can probably show you ways in which our service can save you money. Write Dept. 2-J.

"About five years ago we furnished a replacement 8 ft. x 15 ft. dryer drum to a customer whose dryer had been in service on a Simplicity Asphalt Plant for 25 years. The steel tires and bull gear of the old dryer showed no signs of wear and were used in the new drum. Those rings were supplied to us by Standard Steel Works. That's why we know the quality of Standard's rings is as good as the service they render us," *says Harlan Whitfield, of The Simplicity System Company, Chattanooga, Tenn.*

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes



Another **STANLEY STEEL STRAPPLICATION*** on the job

Annual savings in packaging...$35,000!

Estimated savings of $35,000 a year are reported by the Duriron Company, Inc., Dayton, Ohio since applying the Stanley Steel Strapping System to the packaging of Duriron Corrosion Resisting Pipe. Elimination of wooden crates meant lighter packages that lowered shipping costs. The great reinforcement strength of Stanley Steel Strapping minimized breakage and reduced damage claims.

Find out how you can enjoy similar results and savings.

WRITE FOR YOUR FREE COPY of the "Stanley Strapplication Manual of Packaging and Shipping" to **STANLEY STEEL STRAPPING**, Division of The Stanley Works, Dept. I, 1476 Lake Street, New Britain, Connecticut.

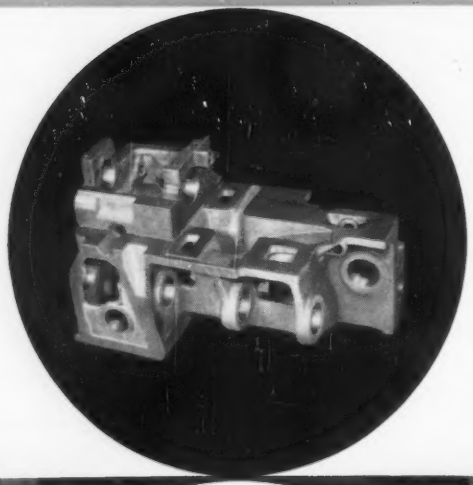
**The system-atic way to solve specific packaging and shipping problems*

INSURE IT-SECURE IT WITH STANLEY STEEL STRAPPING

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works—hand and electric tools • drapery, industrial and builders hardware • door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.



At Brown & Sharpe

Natcos Help From

At Brown & Sharpe, a 22-spindle Natco 3-way Machine handles finished drilling, boring and reaming on "00" screw machine beds

NATCO

Slash In-Process Time
16 Weeks to One Week

On Automatic Screw Machine Beds

Even on precise machine tool parts, traditionally handled on a "job-shop" basis, Brown & Sharpe gained great advantage by installing an automatic line. Prominent in the line are two Natcos, engineered and tooled to handle all drilling, boring and reaming on either the No. 00 or No. 2 automatic screw machine beds.

One Natco does all roughing—the second handles finishing. Total of 62 operations. Each Natco is tooled to process two parts at once—tooling is interchangeable to accommodate either sized bed.

Extreme machine tool accuracy must be maintained throughout. In one operation the Natco drills through five walls, holding centers parallel to the locating surface within .0015" for the full 42" distance. In another case, Natco engineering devised a tooling leaf that automatically drops through a core in the part, providing internal boring bar support.

Natcos make sense even on "job-shop" jobs. Call in a Natco Field Engineer—he can quickly tell you whether a Natco can be a cost-saver on your next job.

National Automatic Tool Company, Inc.

Richmond, Indiana ***Multi-spindle drilling, boring, and tapping machines. Special machines for automatic production.***

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

VANCORAM SILICOMANGANESE

Furnace block, desulphurizer and deoxidizer, all in one—that's Vancoram Silicomanganese. It's also an efficient and economical way to add manganese and silicon. Three types to meet all requirements—1.5%, 2% and 3% carbon grades, all with 65/68% manganese. Also available in square-shaped briquettes containing 2-lb. manganese, ½-lb. silicon. Call your nearest Vanadian Corporation Office for more information about Vancoram Silicomanganese and its many specific uses in steel and iron.

VANCORAM
REG. U.S. PAT. OFF.

VANADIUM CORPORATION OF AMERICA

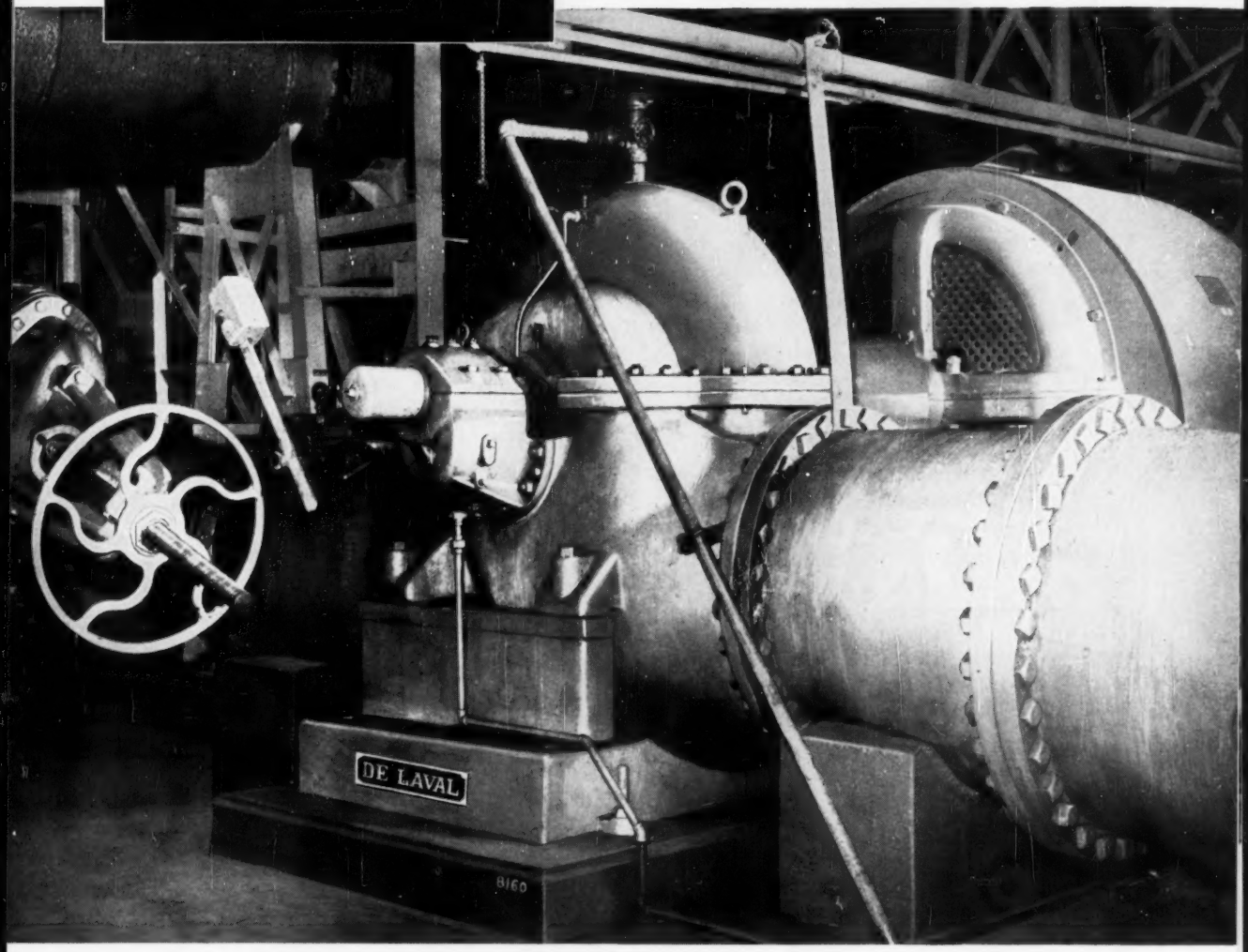
420 Lexington Avenue, New York 17, N. Y.

Chicago • Cleveland • Detroit • Pittsburgh

Producers of alloys, metals and chemicals

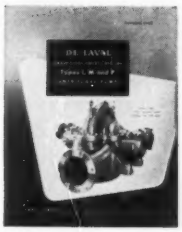
DE LAVAL
CENTRIFUGAL
PUMPS

in service since 1911 at Inland Steel Co.



De Laval Centrifugal Pumps have a record of dependability at the Inland Steel Co., which goes back forty-five years. In that time, De Laval has supplied this major producer with pumps for practically every steel mill service—*more than 75 units in all.* The photograph shows one of the largest De Laval pumps on the line at the East Chicago, Indiana plant of Inland Steel. The unit delivers 20,000 gpm at 120 ft head.

De Laval Centrifugal Pumps are available for a wide range of applications in all types of metal-working plants. Types L, M and P single stage double suction pumps can handle capacities from 1,000 to 20,000 gpm and heads to 350 feet. Larger De Laval units of any capacity to meet any requirement for steel mill service are available.



Send for Bulletin 1004 giving performance and application data.

DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

DL344

Stainless Steel

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Gives Your Product Sales Appeal

Republic ENDURO Stainless Steel is an unmistakable sign of quality in appliances, housewares and flatware. A quality that sets your product off from the commonplace. Quality that changes *eyers* to buyers. Quality that gives your product sales appeal in the market place.

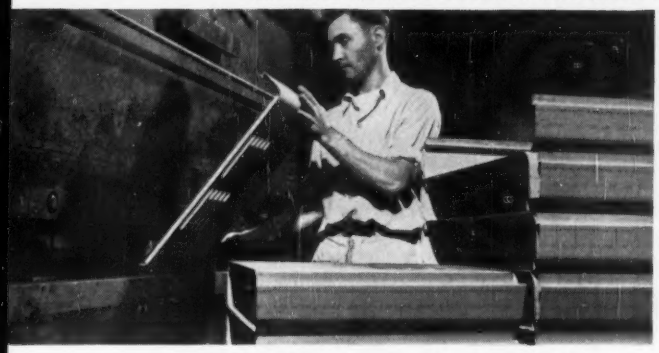
There is no reason why your product shouldn't have this sales advantage now. Fabricate ENDURO on your present equipment, with little or no change in procedure. Bend it, draw it, stamp it, spin it, roll-form it, weld it, solder it, emboss it, etch it—without difficulty.

ENDURO is solid stainless all the way through. There's no surface to wear away. No danger of flaking, peeling, chipping or cracking. No need for expensive plating, lacquering, or electrochemical treatments, to enhance ENDURO's outstanding corrosion-resistance or lustrous beauty.

Use ENDURO in appliances to obtain freedom of design. Its extremely high strength-to-weight ratio permits use of thinner, lighter sections to span large areas in an unbroken sweep. Use ENDURO for brightwork. It has the strength to withstand the abuse of everyday use. Use ENDURO for functional parts. Its strength, heat-resistance and corrosion-resistance make it the perfect metal for any application involving heat and cold. Use ENDURO to give your product sales appeal.

Republic metallurgists and engineers will assist you in selection, application, and processing of ENDURO Stainless Steel. No obligation, of course. Just mail the coupon.

MORE REPUBLIC PRODUCTS FOR SALES APPEAL



REPUBLIC ELECTRO PAINTLOK is used for the exterior panels or cabinets of ranges, refrigerators, freezers, dryers, washers, air-conditioners, etc. It provides an excellent paint-adhering surface—even after severe forming operations. Electro Paintlok is produced by electro galvanizing and a chemical treatment process. Sheets are shipped from the mill in prime condition for painting. Sometimes cleaning and priming may be eliminated. Only the final finish need be applied for full protection and attractive appearance. Send coupon for full details.

REPUBLIC CONTINUOUS GALVANIZED steel sheets solve a variety of problems for manufacturers seeking inexpensive, long-lasting corrosion protection. Continuous galvanized sheets are often used for liners in freezers, coolers and dispensers. The uniform, tight zinc coating won't crack, peel or flake off under the most rugged fabrication. Excellent ductility assures easy workability, yet the sheet is sufficiently rigid to withstand severe use. Completed products are positively protected without the expense of individual hot dip galvanizing after forming. Write for facts.

STEEL

and Steel Products

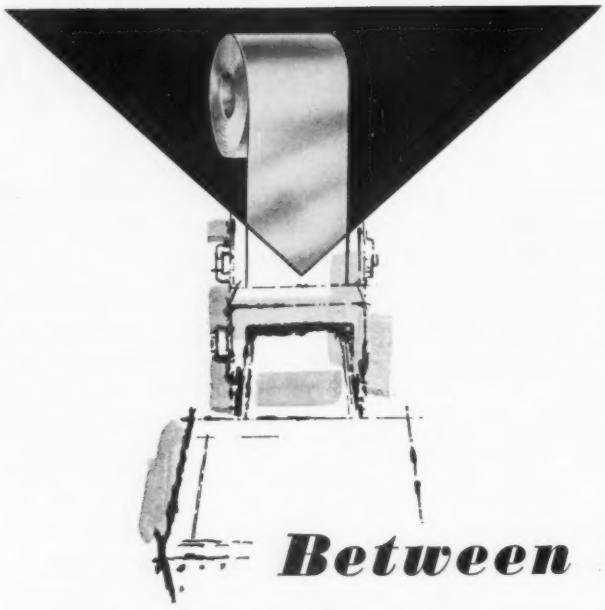
REPUBLIC STEEL CORPORATION
DEPT. C-4370
3120 East 45th Street
Cleveland 27, Ohio

☐ Have a Stainless Steel Metallurgist call.

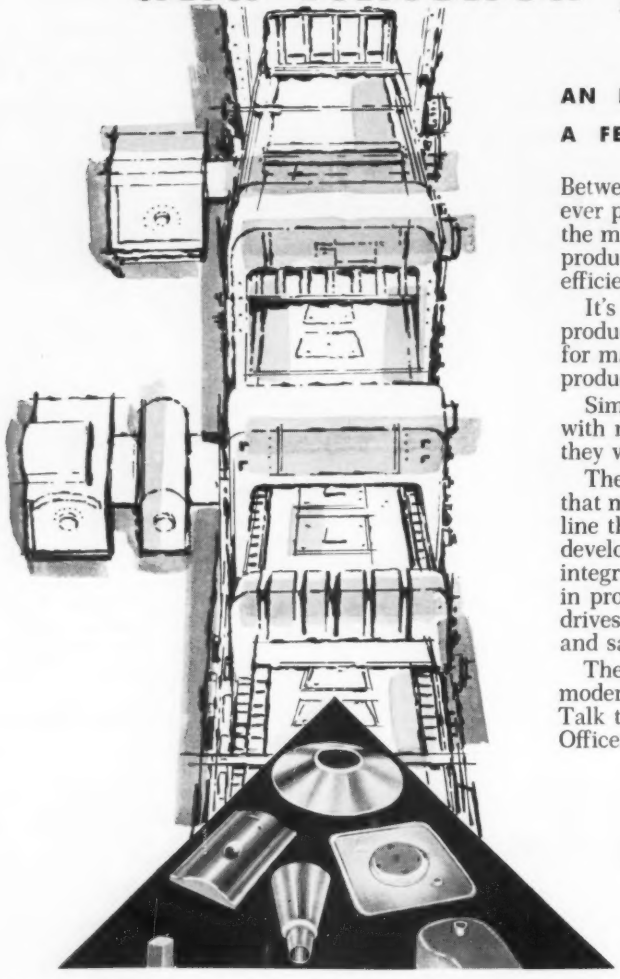
Send more information on:

☐ ENDURO® Stainless Steel
☐ Electro Paintlok® Sheets
☐ Continuous Galvanized Sheets

Name_____ Title_____
Company_____
Address_____
City_____ Zone_____ State_____



Between material and finished part . . .



AN IDEA THAT MAKES SENSE —
A FEDERAL-WARCO PRODUCTION LINE

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production on operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

Federal / Warco
PACKAGED
PRODUCTION LINES

123 THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO

Pickpocket to the tune of $6 billion a year

Yes, *rust*—persistent destroyer of unprotected metal—costs America some $6 billion a year. Yet so much of that staggering waste can so easily be avoided.

How? By using a steel such as Weirkote, with its tightly bonded zinc coating that gives any product or structure the necessary corrosion-resistant finish to repel this destructive glutton year after year.

Weirkote protects steel with a zinc "skin." For it has such a tight and thorough bond, that rust hasn't a speck of bare, exposed steel to feed on. Its coating will not flake or peel even under the most severe fabricating stress: roll forming, spinning, crimping, deep-drawing, stamping, bending. It can be worked and shaped to the very limits of the steel base itself. So whatever the end form, there's zinc protecting the entire surface. No exposed steel. Thus, no corrosion.

Remember, $6 billion is a staggering sum to lose to rust every year. What will it cost you to inquire about the savings Weirkote zinc-coated steel offers you? Just the cost of a post card. Send today for your free booklet giving you a complete new profits picture. Write Weirton Steel Company, Dept. B-24, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

1 Water-cooled power cables.

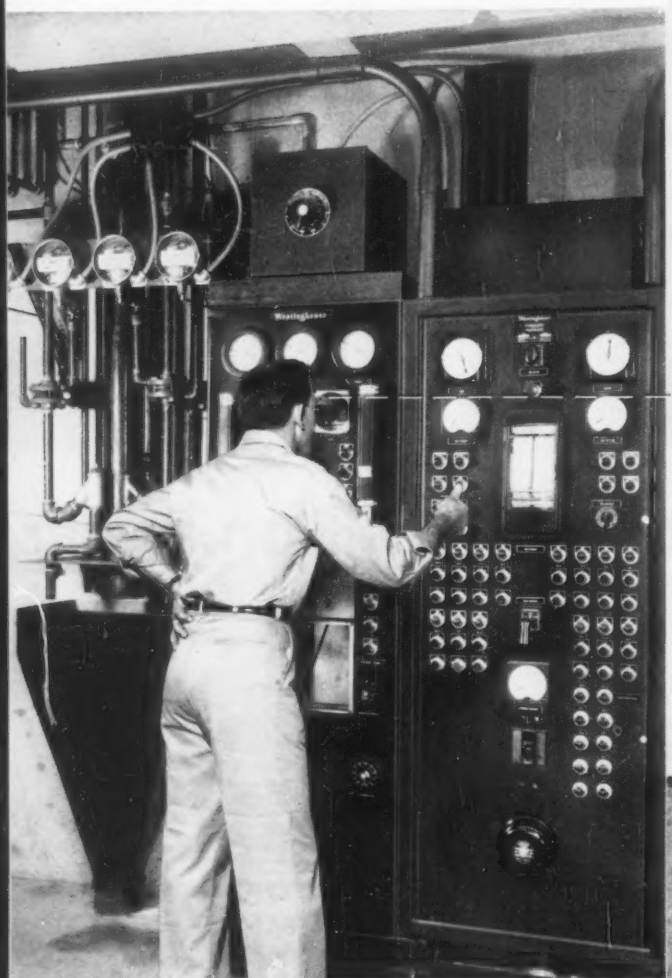
2 Electrode holder.

3 Vacuum-tight seal for electrode housing.

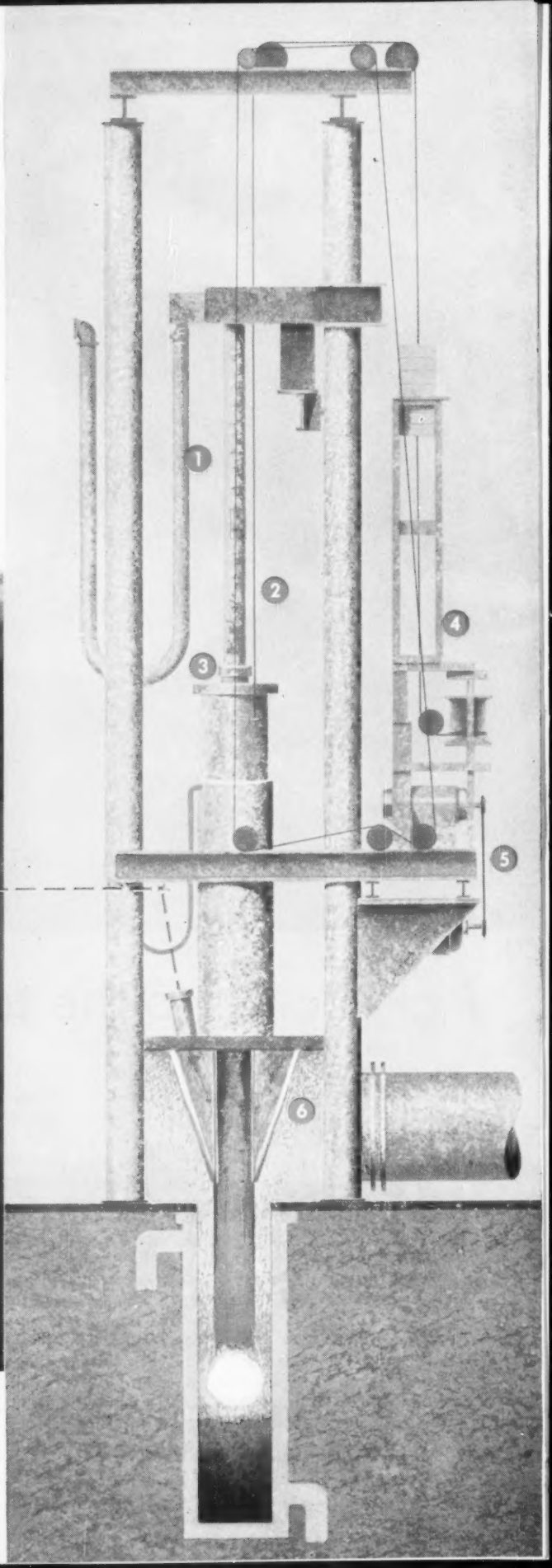
4 Lifting mechanism for electrode housing.

5 Automatic electrode position drive.

6 Electrode guides.



Automatic control panel sequences and monitors vacuum arc furnace operation. Built-in optical system allows operator to observe melting progress.



Westinghouse installs largest vacuum arc furnace at Carborundum Metals Company

Tough requirements for melting large, zirconium ingots have been minimized at Carborundum Metals Company by a new Westinghouse vacuum arc furnace. This furnace produces 8″ or 12″ first-melt ingots and 12″ or 16″ double-melt ingots up to 2200 lbs. Top metallurgical functioning results from careful design and construction.

Furnace design is backed by extensive vacuum chamber research. This work developed methods for controlling the action of an arc in high vacuum. At Westinghouse Metals Pilot Plant these laboratory conclusions were scaled-up in production size melts. Ingot analysis verified furnace design and operating procedure.

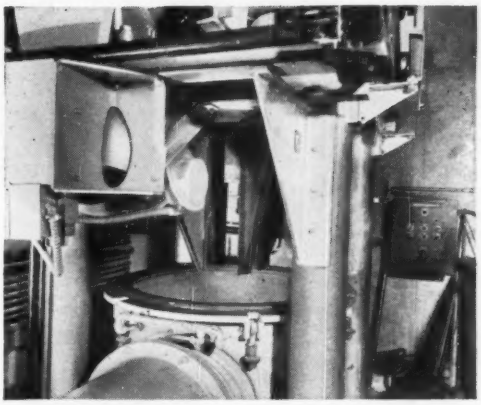
Careful attention was given to electrical and mechanical components, too. Power cables are permanently connected for positive electrical contact. Electrode movement is governed by positive downward drive, and a positioning mechanism guides the electrode on true center. All drive components are externally mounted for easy inspection.

Capable of every step from research to equipment manufacturing, Westinghouse can be a single source for *your* vacuum metallurgy needs. It's another example of the way Westinghouse helps you POWER-UP . . . to get better production and profit from your electrical dollar. Talk it over with your Westinghouse Industrial Heating representative or write Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pa.

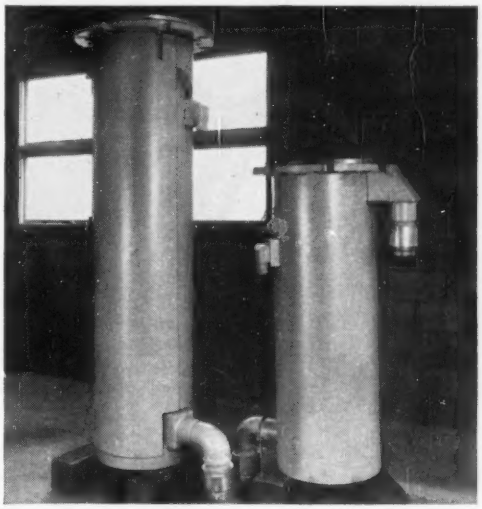
J-10465

YOU CAN BE SURE...IF IT'S

Westinghouse

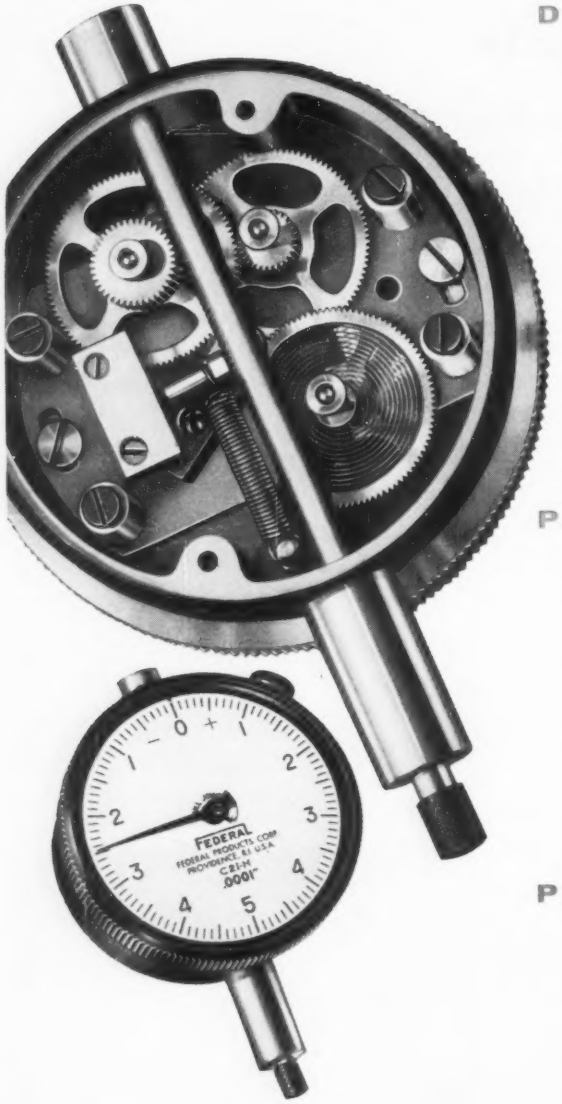


Accurate electrode centering is maintained by fixed guides; sound construction provides added safety.



Sturdy ingot molds, ranging from 8 to 16 inches in diameter afford simple installation . . . large cooling water connections . . . arc stabilization connections.

TRUSTWORTHY



DESIGN . . . At Federal, good design is an attainment to be improved upon. Regular precision bearings are good, but Federal introduced *Jeweled Bearings* which are virtually frictionless and retain their precision longer. A movement integral with the Indicator case is good, but Federal devised the Unit Movement which permits much greater assembly accuracy. The conventional indicating hand is good, but Federal's *dynamically balanced hand* reduces inertia and puts less stress on the movement. And so on . . . through Cushion Movement, Hardened Gears, Wetproof and other design advances, each pioneered by Federal but only after repeated trials had proven they were practical improvements. This cautious yet progressive policy controls the production of all new ideas incorporated in Federal Dial Indicators. It is your guarantee of obtaining the best.

PERFORMANCE . . . ALL Dial Indicators must meet established standards. Federal Dial Indicators must EXCEED them. Closer tolerances at critical points . . . extra steps in production . . . more critical inspection . . . all contribute to the highest quality. In short, better habits of production provide that margin of excellence beyond mere acceptance. True confidence begins with that margin wherein lies the extra accuracy . . . strength . . . dependability needed to fulfill the severe, as well as the ordinary requirement . . . without question. This is why more Federal Dial Indicators are used than all others combined.

PRICE . . . We do not offer a premium price as proof of excellence. We wouldn't because it is not proof. *We can't* because Federal Dial Indicators are generally *lower* in price than competitive makes. Lower than standard prices for a better product are only possible through the large volume demand generated by industry's wide *preference* and the economies of manufacturing efficiency. The sum total significance to you is . . . Federal Dial Indicators are a better investment.

See the most extensive line of Dial Indicators in Catalog 55. Ask for your copy.

FEDERAL PRODUCTS CORPORATION
7219 Eddy Street • • Providence 1, R. I.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

"WHAT'S YOUR LINE?"

CHEMICALS, PRIMARY METALS, MACHINERY?

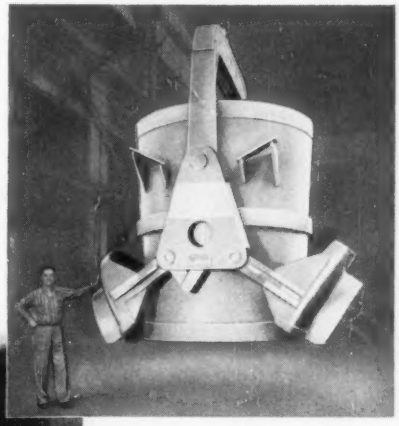
Special indexing machine tool base over ten feet in diameter, weight nearly ten tons.

You name it—and the odds are two to one that McGregor-Michigan is experienced in *your* line. We're turning out an endless miscellany of steel plate fabrications for industries across the nation. As part of the proof of our ability and versatility, here are a few of the products of the manufacturers and processors we're serving:

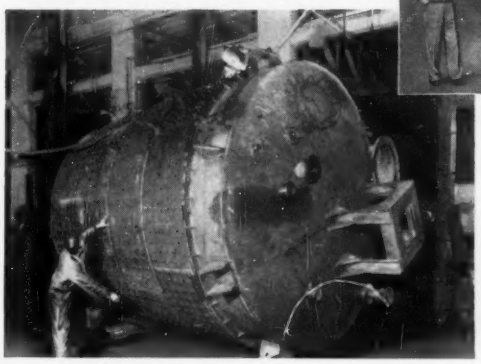
Acids, alkalis, fertilizers, glass, refractories, plastics, petroleum, steel, aluminum, automation and special machinery, explosives, paper, diesels, cement and rock products, coke by-products, leather, soap, tools and dies, textiles—and numerous variations of these.

As further evidence of the reliability of McGregor-Michigan, we're proud to point out that the frequent repeat orders from these fine customers are the surest indication that we've earned their good will. How? By seeing that all factors are in balance: price, quality, delivery and service—for it is only by complete attention to *all* of these that we are able to fully satisfy our many diversified customers.

If you don't see your particular industry included in the list above, think of the many problems these customers have thrown at McGregor-Michigan —then go and do thou likewise.

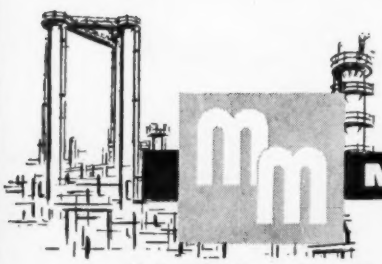


Steel mill scrap bucket. Linkage equalizes opening of clamshell halves.



Stainless steel jacketed chemical mixing kettle. Operates under vacuum and atmospheric pressure, medium high temperatures.

Send for new booklet showing equipment and typical steel plate fabrications.



SINCE 1841

McGREGOR-MICHIGAN CORPORATION

5919 RIVARD • DETROIT 11, MICHIGAN

TRINITY 2-2400

STEEL PLATE FABRICATING AND WAREHOUSING

NOW...

self-reducing

VANADIUM

self-reducing

TUNGSTEN

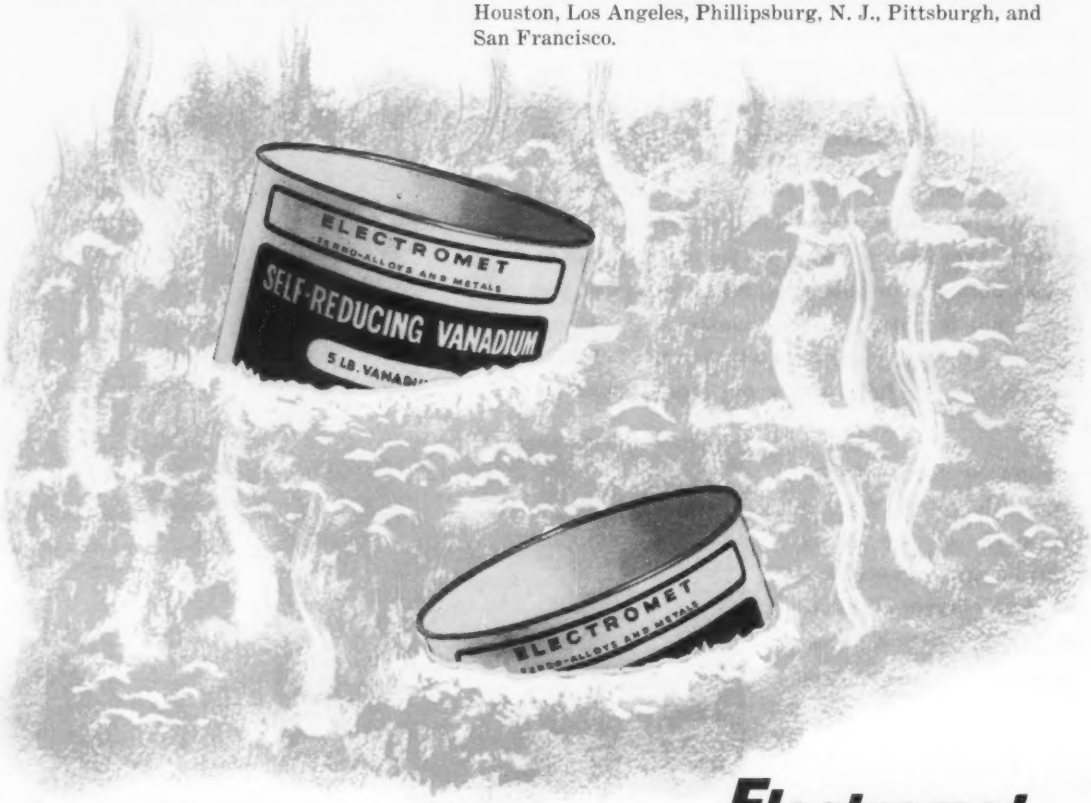
These new highly soluble alloys are economical furnace additions for steels and high-temperature alloys made in the electric furnace. The "built-in" reducing action yields the alloying element quickly and uniformly to the melt. Thus you get:

- **Consistently high recoveries**
- **Minimum of segregation**
- **Better control of final analysis**
- **Shorter furnace time**

Both alloys are available in cans containing a definite weight of the alloying element, eliminating weighing and spillage. The ingredients are completely moisture-free. Shipments can be palletized for easier handling, storage, and inventorying. For further details, consult your nearest ELECTROMET representative.

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Toronto.

Offices: Birmingham, Chicago, Cleveland, Detroit, Houston, Los Angeles, Phillipsburg, N. J., Pittsburgh, and San Francisco.



Proven in use! In commercial heats, 85 to 95 per cent tungsten recoveries and 98 to 100 per cent vanadium recoveries have been reported. Melters have been impressed by the rapid solubility of both alloys.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

GENERAL ELECTRIC ANNOUNCES

New Totally Enclosed D-c Motors

KINAMATIC* . . . to meet modern needs for faster, more automatic production in severe environments, General Electric announces a complete line of totally enclosed direct-current motors.

Designed for Tough Duty, d-c Kinamatic enclosed motors give you maximum mechanical protection *plus* the wide speed range and versatility required for close control of machines and split-second timing of processes.

Standard Mounting Dimensions of enclosed d-c Kinamatic motors save you time and money. With this better protected, more powerful direct-current motor, your machines will operate with less downtime . . . faster . . . easier . . . and with less maintenance.

Additional information is available at your nearest General Electric Apparatus Sales Office. Or, if you prefer, write for Bulletin GEC-1372, *Direct Current Motor and Generator Department, Erie, Pennsylvania.* 813-10

*Trade-Mark of the General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

(Advertisement)

Kaiser Aluminum ingots being prepared for "homogenizing" in Gas-fired furnaces prior to extrusion into aircraft parts

GAS assures precision alloy extrusions at Kaiser Aluminum

Gas plays a major role in the development of precision quality alloy extrusions for aircraft at the U. S. Air Force Heavy Press Plant operated by Kaiser Aluminum at Halethorpe, Maryland.

With Gas, uniform temperature and controlled atmosphere keep molten aluminum flowing smoothly into casting equipment. The metal is cast into logs about 12 to 26 inches thick and 25 feet long. Gas-fired furnaces heat the logs to 1000° F and hold this temperature about 24 hours to homogenize the metal prior to extrusion. The long logs are cut into 58 inch billets, placed on the press and extruded into various shapes.

Again, Gas is used to heat the extruded shapes in a controlled atmosphere to impart the desired physical qualities in the alloys used. As in the melting process, Gas provides precise temperature control and close control of atmosphere within the furnace.

For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results Gas and modern Gas equipment provide. *American Gas Association.*

Something new... made better by aluminum

Aluminum "sail" of atomic sub breaks water as ship surfaces. "Sail" is the protective sheathing around superstructure and controls.

New alloys make aluminum a seagoing metal

The new atom-powered submarines "Nautilus" and "Seawolf" offer dramatic proof that aluminum can be just as much at home in salt water as on dry land. Both of these modern vessels are equipped with streamlined aluminum sheathing above decks to reduce topside weight. Other interesting marine uses of aluminum include a speedy new Canadian subchaser, the superstructure of passenger ships like the new Norwegian liner *Bergensfjord* and the S. S. United States and hundreds of different types of pleasure craft.

Key to the use of aluminum in many of these marine applications is the development of special alloys and welding techniques by Aluminium Limited research. With these problems solved, aluminum fabricators are sure to find larger markets in the shipbuilding field.

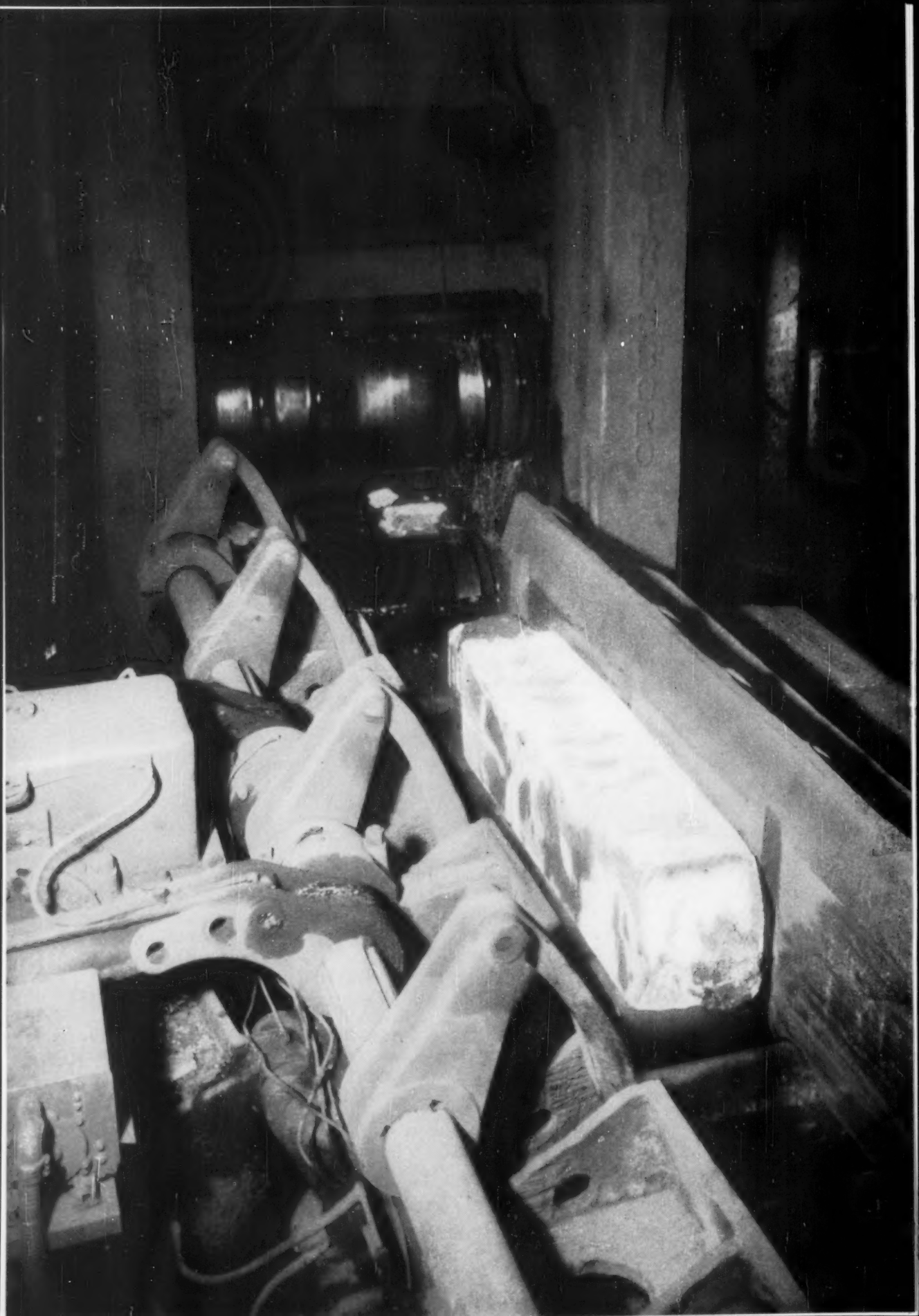
Through research, new and different uses for aluminum are broadening fabricators' markets everywhere. To help assure a dependable supply of primary metal for independent fabricators, Aluminium Limited is investing $3,000,000 a week in additional production facilities.

Supplying U.S. industries with primary aluminum from Canada

Aluminium Limited Sales, Inc.

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • DETROIT • LOS ANGELES • BUENOS AIRES • SÃO PAULO



Big Ingot Reduction Contributes to Superior Quality Stainless Steel at J & L

The quality of stainless steel is assured at the J & L Stainless Steel Division because the large capacity furnaces permit the pouring of larger ingots. For example: When an ingot is cast, its structure is coarse and its grains are exceptionally large. To develop greater strength, it must be "hot worked" into blooms or billets; and because of the larger ingot size, J & L is able to roll ingots to blooms or billets with more reduction than is the normal practice in most mills.

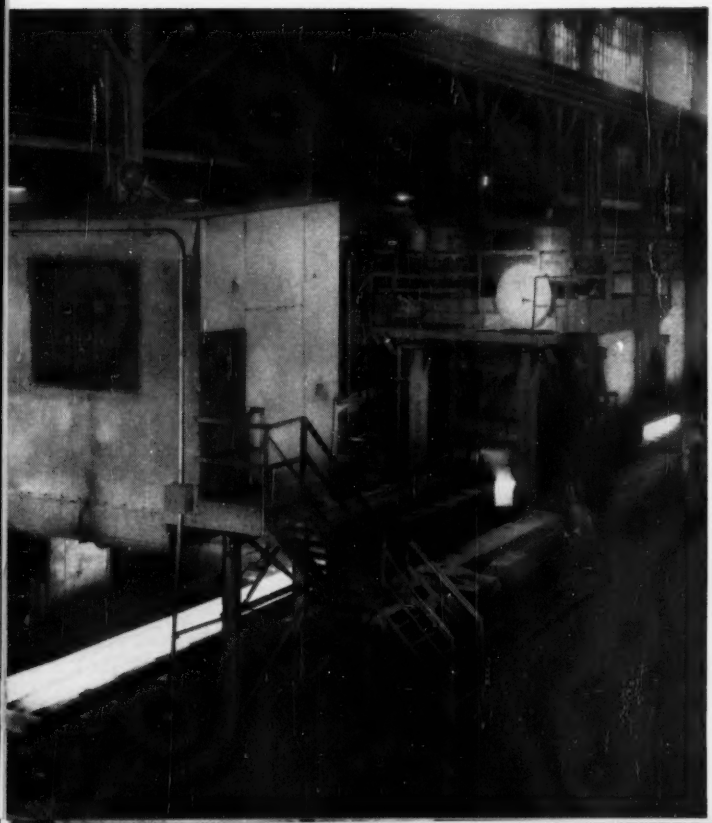
The result is sound, pipe-free centers, finer grain and more uniform structure.

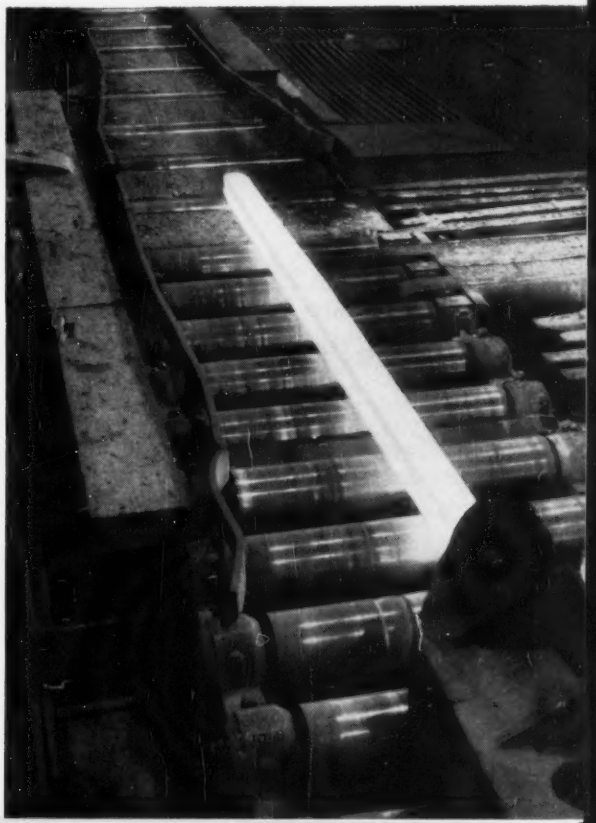
This is just one more factor—one more facility—contributing to the continuing effort at the Stainless Steel Division of J & L, to bring to its customers the highest quality stainless steel available.

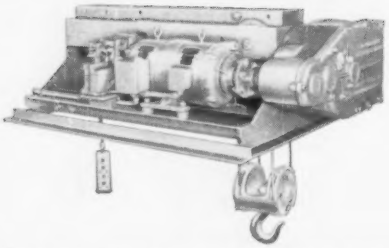
Ready-to-ship Inventory Adds a *Plus* to Quality

Quality, plus the ability to ship a wide range of stock *immediately*, is an unbeatable combination. A stock of hundreds of tons of finished stainless bars is now available from our storage facilities. Write for our latest stock lists, or for quotations on finished bars or billets.

Jones & Laughlin
STEEL CORPORATION
STAINLESS STEEL DIVISION
Box 4606 • Detroit 24, Michigan
FORMERLY ROTARY ELECTRIC STEEL CO.

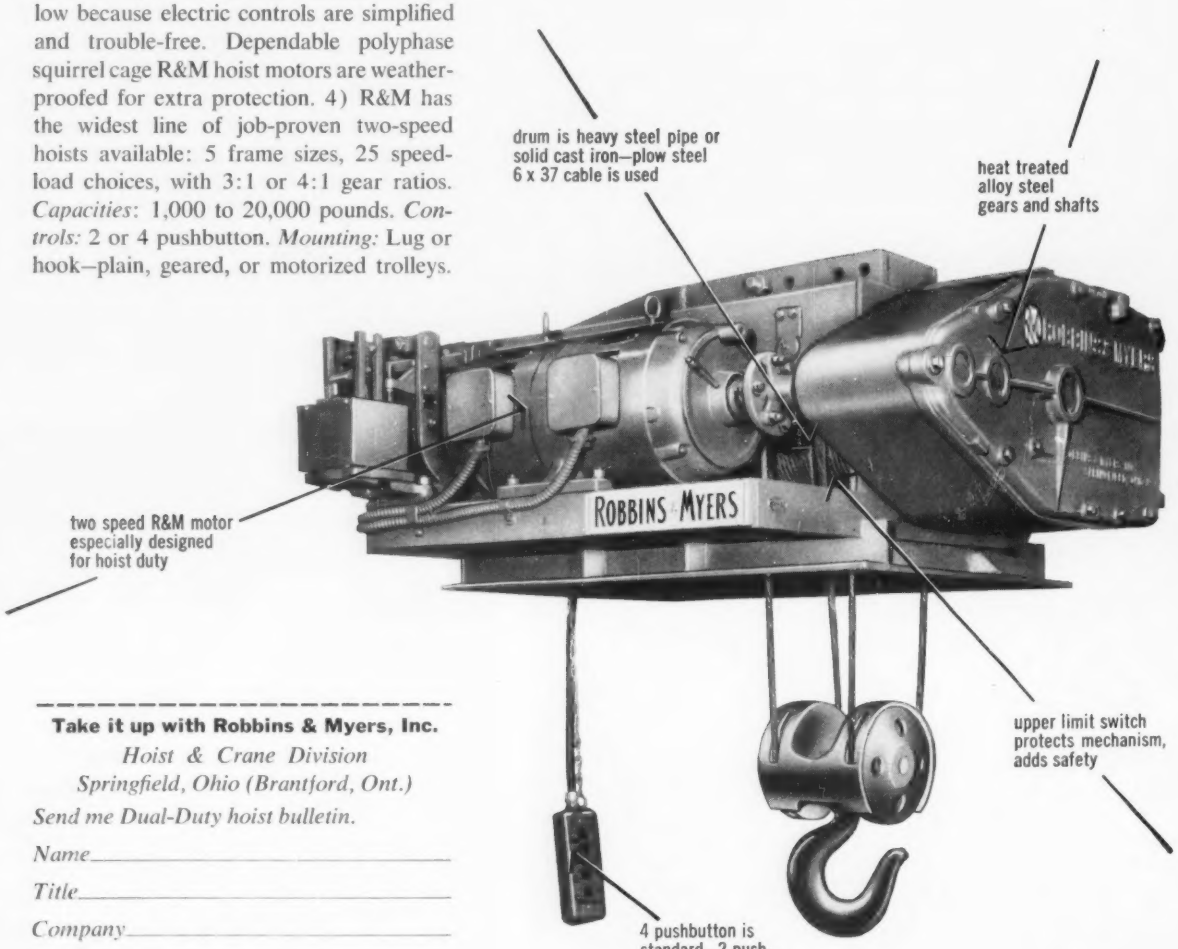






Dual-Duty two speed hoists give you *precise* load spotting, plus fast lifting when you want it. Four outstanding advantages make R&M Dual-Duty hoists your best buy when you can't afford performance compromises: 1) You always have two stabilized speeds to raise or lower any load within the capacity of the hoist. 2) Dual Duty hoists are thus easy to operate—they perform exactly the way the operator wants them to. 3) First cost and maintenance are low because electric controls are simplified and trouble-free. Dependable polyphase squirrel cage R&M hoist motors are weatherproofed for extra protection. 4) R&M has the widest line of job-proven two-speed hoists available: 5 frame sizes, 25 speed-load choices, with 3:1 or 4:1 gear ratios. *Capacities*: 1,000 to 20,000 pounds. *Controls:* 2 or 4 pushbutton. *Mounting:* Lug or hook—plain, geared, or motorized trolleys.

slow spotting, fast lifting hoist


drum is heavy steel pipe or solid cast iron—plow steel 6 x 37 cable is used
heat treated alloy steel gears and shafts
two speed R&M motor especially designed for hoist duty
ROBBINS MYERS
upper limit switch protects mechanism, adds safety
4 pushbutton is standard—2 push-button is optional at no extra cost

Take it up with Robbins & Myers, Inc.

Hoist & Crane Division

Springfield, Ohio (Brantford, Ont.)

Send me Dual-Duty hoist bulletin.

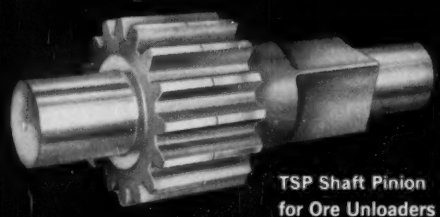
*Name*_____

*Title*_____

*Company*_____

*Address*_____

ROBBINS & MYERS **hoists • cranes • winches**

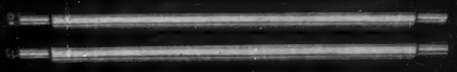


TSP Shaft Pinion
for Ore Unloaders

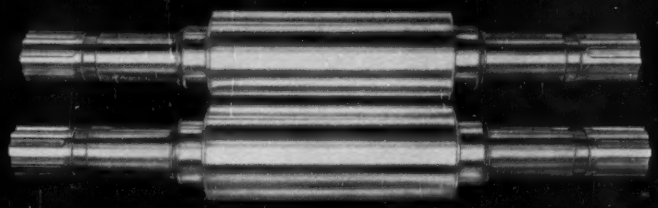
TSP Screw Down Screw and Nut for Blooming Mill

TSP Cone Crusher Gears

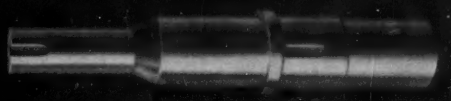
TSP Brake Wheels



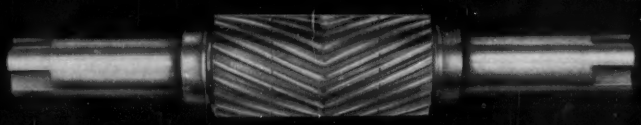
TSP Leveller Rolls for Steel Mills



TSP Rolls for Steel Mills

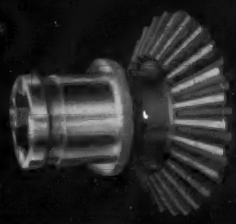


TSP Crane Wheel Axles

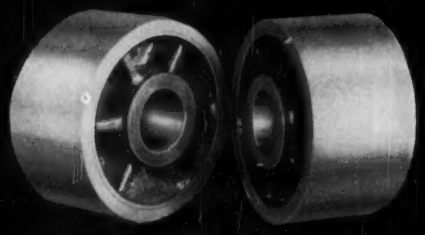


TSP Pinions for Steel Mills

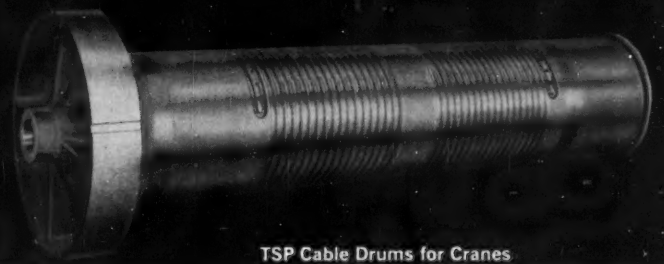
TSP Sprockets



TSP Edging Mill Bevel Gears



TSP Trunnion Rolls for Kilns



TSP Cable Drums for Cranes

TSP hardened parts can save you thousands of dollars

"Tool Steel Process" hardened parts give you savings in maintenance, replacement, and production.

TSP products are long wearing, need hardly ever be replaced . . . and are so carefully designed and made, that your equipment runs longer and more economically. In wide usage in practically every industry, they are guaranteed in writing to outlast, out-perform any competitive part in the same service. Their phenomenally long wearing qualities are a result of our special hardening process. The file hard surface to the full depth of permissible wear gives maximum life. The core, refined for toughness and ductility, gives maximum strength. Note the depth of hardness on gear tooth cross section.

TSP hardened parts, a few of which are illustrated, are made to order from your blueprints, or to fit existing equipment. Gears made in sizes to 90" diameter. Other products up to 20,000 lbs. weight. Write for Bulletin 352 "Why Are They Called TSP Products" and complete information about TSP applications for your equipment.

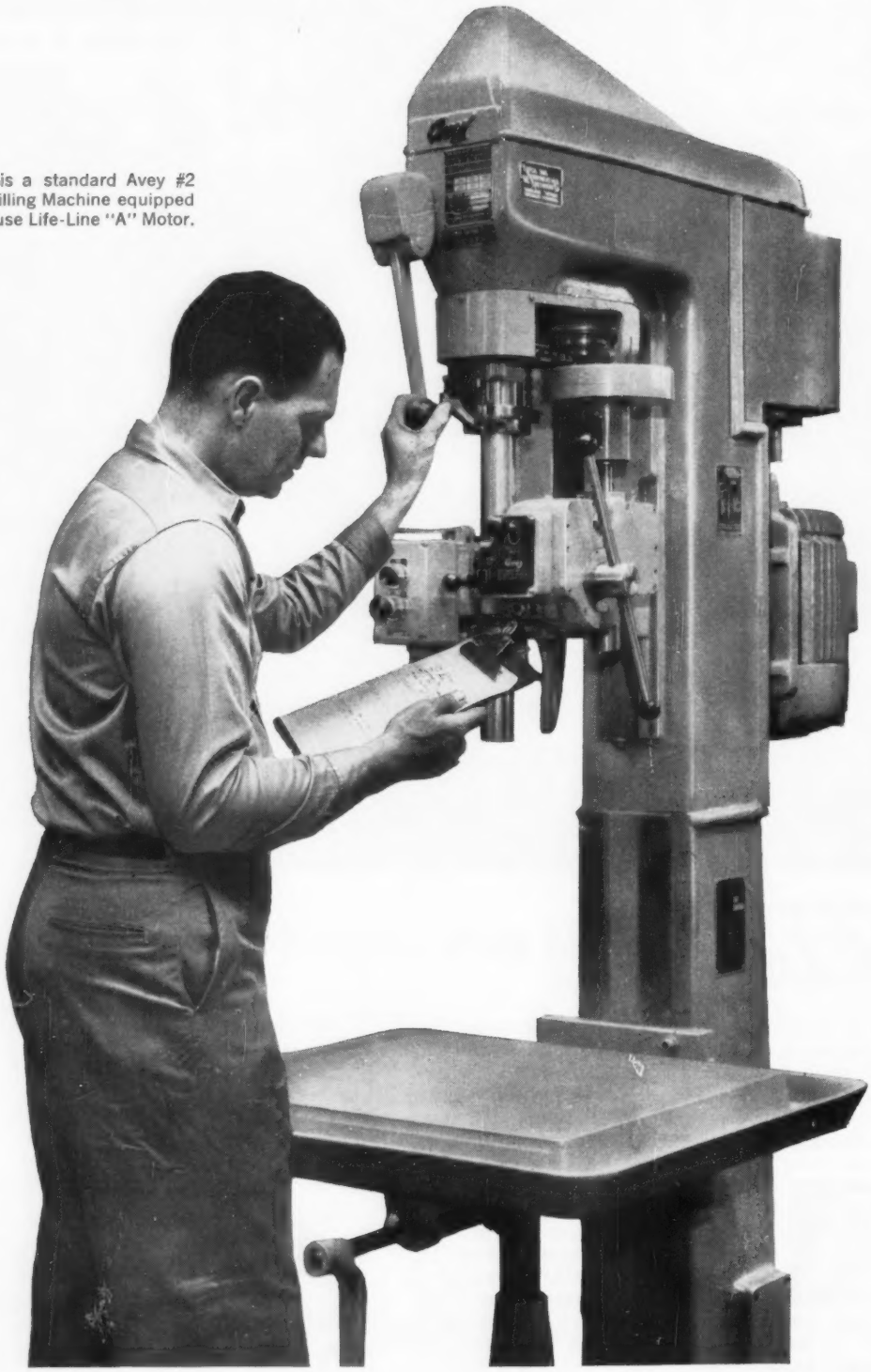
THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI 16, OHIO, U. S. A.

AD 1027

The Standard of Quality Since 1909 for Gears • Pinions • Rolls • Wheels and Other Hardened Products

Life-Line A motor-equipped BMA

Machine shown is a standard Avey #2 type "BMA-6" Drilling Machine equipped with a Westinghouse Life-Line "A" Motor.



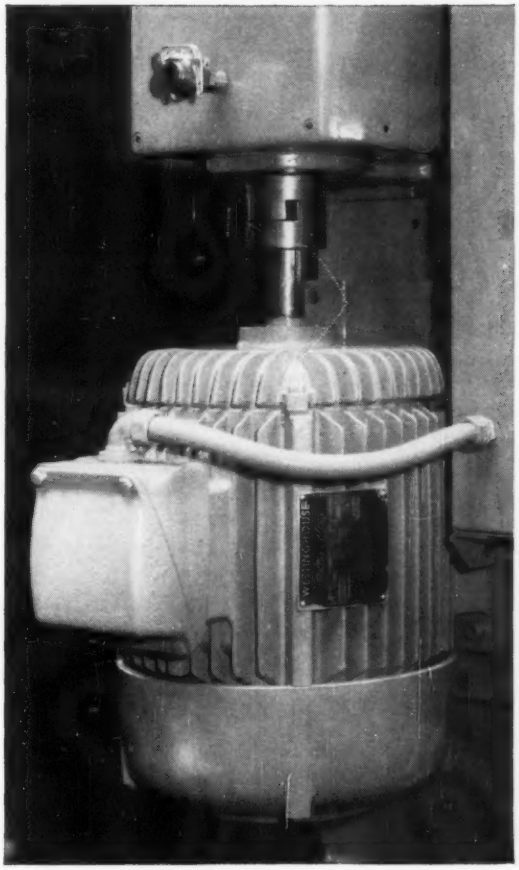
drills reverse within 1/3 revolution ... make 40 reversals per minute

Westinghouse Life-Line "A" motors are used on Avey drills, manufactured by the Avey Drilling Company, Cincinnati, Ohio, for both tapping and drilling. Tests indicate that spindle reversals can be made within ⅓ revolution.

For machine tool applications, such as the Avey BMA—6 Drill, motor performance is critical. For high reversal duty and the ability to withstand momentary overloads, nothing can surpass the Life-Line "A." Superior insulation means superior performance—and the Life-Line "A" with Mylar slot cell, Bondar Wire, and Bondite Silicone impregnated varnish has the finest insulation of any standard motor on the market today.

You can POWER-UP for more profitable production with Life-Line "A" Motors. See your local Westinghouse sales engineer, or write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J-22046



YOU CAN BE SURE...IF IT'S

Westinghouse

Powder-washing with the
OXWELD C-62 Blowpipe—fast,
efficient, economical.

Another Foundry Goes Modern!

No costly, time-consuming chipping and grinding here.

This foundry has gone modern . . . with powder-washing.

Powder-washing is the fastest, most efficient way to remove fins, pads, sand inclusions, and other defects from casting surfaces.

THE RESULT? *Increased production and profits!*

Call your nearby LINDE representative or write for more information today.

LINDE COMPANY DIVISION OF **UNION CARBIDE** CORPORATION

30 East 42nd Street, New York 17, N. Y.

"Linde," "Oxweld," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Specialties of the House

ROEBLING is a specialist in galvanizing, with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283″ to .035″. . . Roegal (drawn galvanized) from .187″ to .005″.

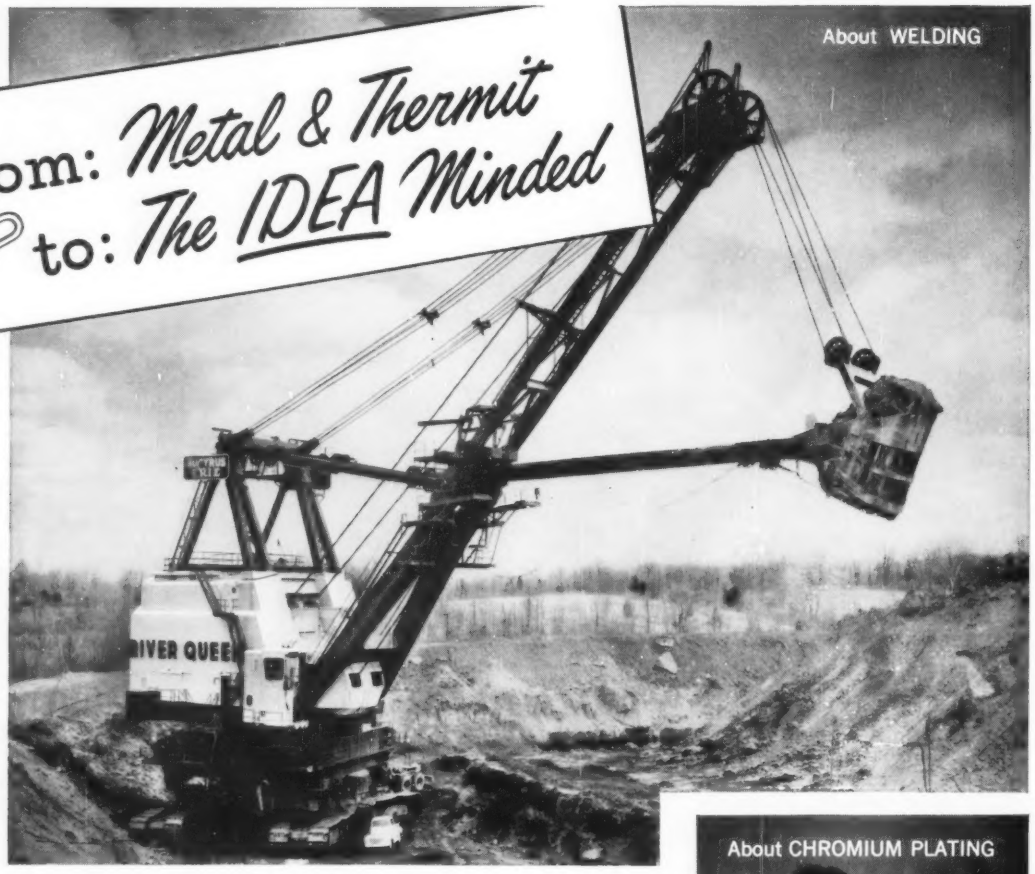
You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

from: Metal & Thermit to: The IDEA Minded



Taking a big bite out of costs

Built by Bucyrus-Erie, this mammoth all welded shovel makes shorter work out of coal stripping operations. In one bite, it scoops an 80 ton load into its 14 x 12 x 9 foot bucket . . . bigger than an average room. The shovel stands 13 stories high, weighs more than 4,000,000 pounds . . . and is built for long, trouble-free service with strong welded connections.

Metal & Thermit's "Murex" electrodes were selected for many applications on this big welding job. These versatile, easily handled electrodes are used throughout industry wherever strong and reliable welds with good impact qualities are needed.

Jobs for plastisols become bigger . . . and still BIGGER

Interior of this large fume scrubber was *sprayed* with Unichrome Plastisol by Kaybar, Inc., Birmingham, Mich. The thick vinyl coating withstands abrasion, acids, alkalies, and many other corrosives. Being pore-free and seamless, the Unichrome Plastisol lining is now preferred for many jobs where rubber or plastic sheet linings were used formerly.

Note that sheer size is no longer a hindrance in applying plastisols. Firms like Kaybar with ever-expanding facilities are located at key points and can handle *your* big jobs, too.

Key performance in typing

Every buyer of an IBM Electric Typewriter knows how easily and economically it operates. Little do they know, however, of the many quality details that go into its construction for extra dependability.

Trip levers, for instance—vital links between key and letter—are chromium plated for increased resistance to wear and corrosion. Unichrome SRHS® Chromium is plated from a Unichrome Continuous Chromium Plating Barrel which assures complete coverage of parts, large output and economical operation.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.

Got a broaching problem?

You may need the machinability and toughness of **REX M-2-S** high speed steel for your broaches. Call your Crucible warehouse.

Find it's a tough job to get accurate tooth radii, heights and lands in your broaches? And that the accuracy doesn't last because the tool steel isn't sufficiently wear-resistant?

Call your Crucible warehouse. They'll recommend Rex® M-2-S, a sulphurized modification of Crucible's Rex M-2 High Speed Steel. This steel provides an improvement in machinability of about 25 to 35% under normal conditions. It has red hardness equal to 18-4-1, yet costs substantially less and offers superior wear resistance and toughness. Try it! You'll get longer use from broaches, drills, chasers, milling cutters and even hack saw blades.

Rex M-2-S is only one of the dozens of special purpose steels stocked in the sizes and shapes you need at nearby Crucible warehouses. And remember:

Crucible is the only specialty steel producer *fully integrated to the point of use.* That means control and responsibility from raw material to warehouse delivery to you.

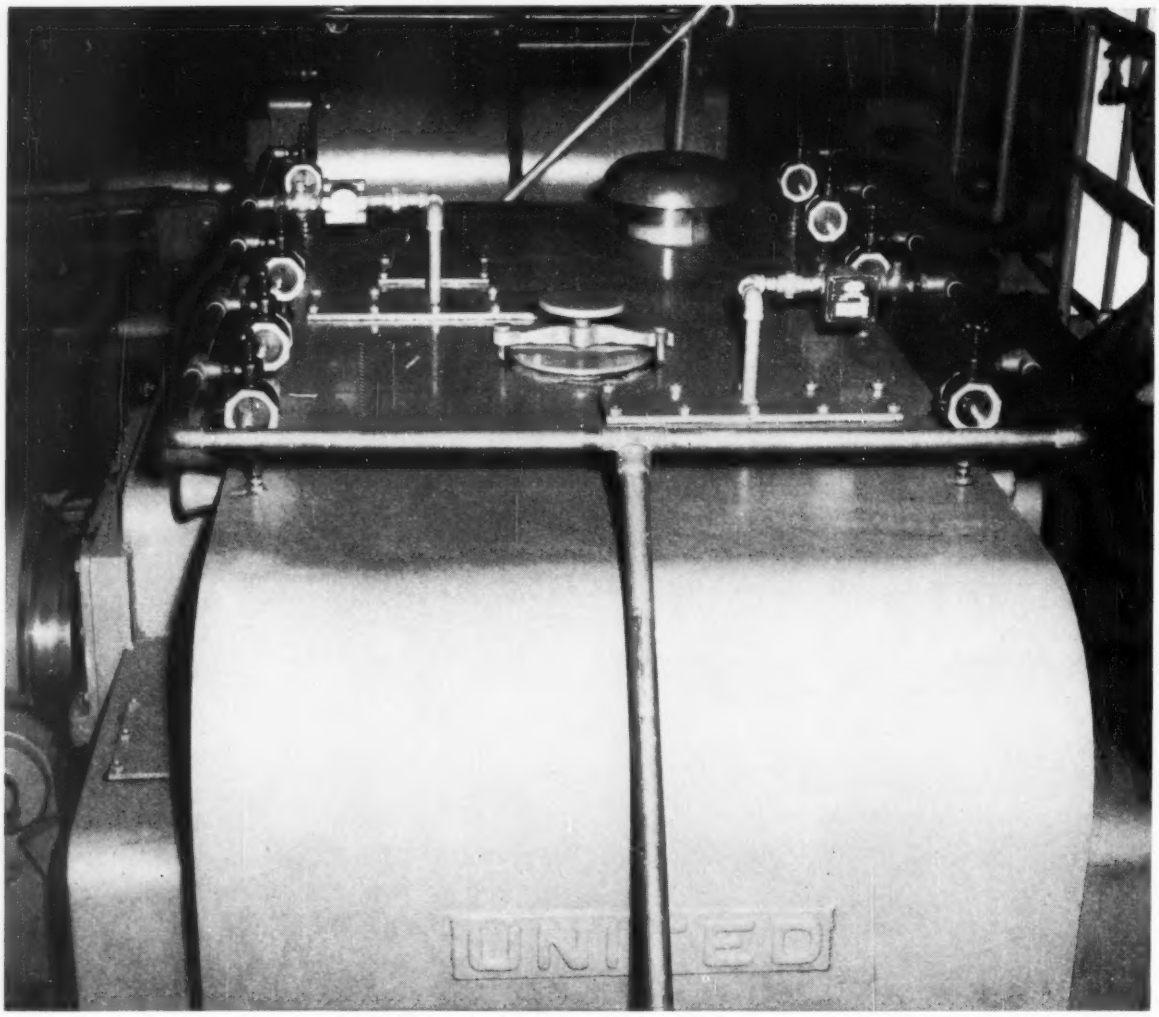
STOCKS MAINTAINED OF:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, Hy-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.



How Texaco Meropa Protects Gear Drives Against Heavier Loads, Higher Speeds

The trend toward heavier loading and higher speeds means increased output at lower unit cost, but it calls for greater attention to lubrication needs. *Texaco Meropa Lubricants,* for example, designed for severe service conditions, are extreme pressure lubricants that cushion metal surfaces against wear, allow gears to operate smoothly. Special polar additives in *Meropa* effectively maintain a protective oil film during heavy shock loads.

There is a full line of *Texaco Meropa Lubricants,* whose high load carrying capacity exceeds all requirements of main drive units, and other steel mill machinery. Let an experienced Texaco Lubrication Engineer suggest the best ones for your conditions. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

STEEL

September 2, 1957

Metalworking Outlook

Misstep for Mr. Reuther?

Walter Reuther's advice to the Big Three auto companies on $100 price reductions for 1958 cars may backfire when he starts formal wage negotiations next spring. The United Auto Worker president is one of the first major labor leaders publicly to admit, even tacitly, that high wages contribute to high prices. The auto companies' replies in turning down the union scheme all indicate they won't forget that admission when brass-tack bargaining time rolls around. Henry Ford II points out: "Your (Mr. Reuther's) letter expresses recognition of the basic relationship between rising labor costs and inflation." He adds: "An increase equivalent to 1 cent an hour in wages would result in an increase in the labor cost content of more than $5 per car."

Craft Union To Hit UAW in 1958

Society of Skilled Trades, a group of craftsmen that broke with the UAW in 1955, will make a last-ditch attempt to become an important union in 1958. A National Labor Relations Board ruling forbade it to try to win allegiance of most UAW members until next year when the UAW auto contracts expire. SST can try to win representation elections at new auto plants, but it has had indifferent luck at that. Odds are against its persuading many of the 400,000 skilled workers in the UAW's 1.5-million membership to desert Mr. Reuther next year. Present SST membership is about 5000, mostly tool and die men.

Borrowing Costs More

If you must borrow money this fall, remember that interest rates are the highest in nearly 25 years. The prime rate for bank loans is at 4.5 per cent; municipal bonds yield around 3.6 per cent, highest since 1935; high quality corporate bonds yield about 5 per cent; commercial paper sold through dealers is yielding slightly over 4 per cent. Corporate security offerings reached a record $6.9 billion in the first half.

Revolution in Canmaking

"Tomorrow's can plants will be as different as today's factories are from the old tinsmith shops where cans were made in the early 1800s," says William C. Stolk, American Can Co. president. He believes the milestone was passed in doing away with handling tin plate in sheets and turning to coils. The coil process went into operation in Tampa, Fla., in May and will eventually be used in all the company's tin plate facilities.

Europe: Lucrative Mass Market

The European common market and free trade area may soon be one of the world's most lucrative mass markets, believes Willard F. Rockwell Jr.,

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president of Rockwell Mfg. Co. In support of the belief, his company is negotiating to purchase facilities abroad to serve that area.

Russia Goes to Water

Russia is rapidly modernizing its water transportation system. Reports National Rivers & Harbors Congress, Washington: 1. By 1960, the Soviets will build an atomic ice breaker to clear its ice-jammed ports and Arctic sea routes; within the last decade, the navigation season in the Arctic has been extended by 20 to 30 per cent. 2. By 1960, 19 big new ports will be started. 3. Twenty-five or thirty new rail-water terminals are planned for construction before 1970.

Exploration in the Arctic

A three-year expedition to explore the Arctic for minerals and oil is being financed by Cyrus Eaton, List Industries Corp., and Scurry-Rainbow Oil Ltd., Canadian oil enterprise backed by Cleveland-New York interests. Center of the exploration will be Baffin Island, which is about the size of Mexico. It's some 300 miles north across the Hudson Straits from the Eaton-controlled Ungava iron ore deposits.

Coming: Uranium Merger

Five uranium firms may merge into the largest independent uranium mining company in the U. S. Floyd B. Odlum, president, Atlas Corp., is behind a deal to merge Hidden Splendor Mining Co., Lisbon Uranium Corp., Rio de Oro Uranium Mines Inc., Mountain Mesa Uranium Co., and Radorock Resources Inc. The Atlas investment firm already has interests in the first three. The combined organization would have proved reserves with a value in the ground of more than $100 million. Hidden Splendor would be the surviving company.

Memo from Washington

The value of new construction put in place in July rose less than seasonally to $4.4 billion, about the same as the record July figure of 1956 . . . Net spendable earnings of factory workers rose slightly between June and July, but the rise was more than offset by the increase in the consumer price index . . . Office of Defense Mobilization will close the expansion goal for liquid oxygen and liquid nitrogen . . . Securities & Exchange Commission opposes as "unfair" a proposed reorganization plan for Northeastern Steel Corp., offered by Carpenter Steel Co., which hopes to acquire Northeastern's facilities.

Straws in the Wind

Shipments of automatic gas water heaters totaled 206,400 units in July, 11 per cent fewer than in July, 1956 . . . Studebaker-Packard Corp. will add a smaller economy auto to its Scotsman line . . . State taxes are up 8 per cent in 1957, to $14.4 billion.

OH, OH, HERE COMES "DIET SMITH". I SEE HIS WIFE'S GOT 'IM ON SHORT RATIONS AGAIN.
HE EATS BETTER OFF US THAN WHEN HIS WIFE FEEDS HIM. I WONDER HOW HE LASTS THROUGH VACATION.
HIM SCROUNGING THE LEFT-OVERS SURE KEEPS THE RATS SKINNY!
THANKS TO OPEN HEARTH CREW BUCKEYE STEEL CASTINGS CO. COLUMBUS, OHIO
KUEKES

The Scrounger

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

New Aluminum-Coated Steel
can give your products long life at low cost

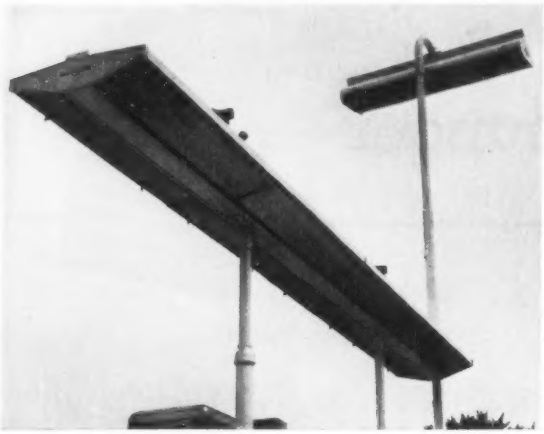
Armco ALUMINIZED STEEL Type 2 offers unusual combination of corrosion resistance, strength, heat reflectivity and economy.

ALUMINIZED STEEL® Type 2, sheet steel coated with aluminum on both sides by a special hot-dip process, gives designers unique opportunities to improve product performance. This economical mill-coated material provides the structural strength of steel and the durable protection of the aluminum coating.

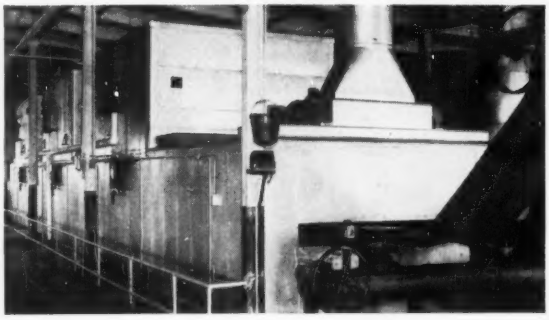
17-year tests in an industrial atmosphere show the life of the coating on ALUMINIZED Steel Type 2 is at least 3 times that of a standard zinc coating on unpainted galvanized steel.

Here are a few typical examples of where and how this new 2-in-1 metal is reducing production and maintenance costs and improving product performance.

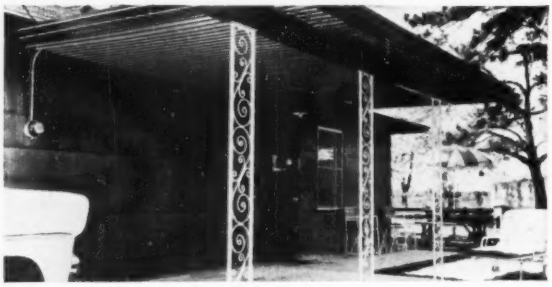
Roof Decking, Rolling Doors, Siding, Building Products . . . For strength, atmospheric corrosion resistance without painting, low maintenance.



Outdoor Lighting Fixtures, Display Racks, Signs . . . For low cost durability, strength, and preservation of attractive appearance in outdoor exposure.



Drying Ovens in Chemical Textile Processing . . . For lasting protection against corrosion without painting, plus savings due to high heat reflectivity of the aluminum coating. (It reflects 80% of incident radiant heat.)



Carports, Awnings, Outdoor Clothes Dryers . . . For most economical combination of necessary strength and atmospheric corrosion resistance.

Armco ALUMINIZED STEEL Type 2 is produced in sheets and coils from 14 to 26 gage. Check the unusual advantages of this metal for your products. Let us send you complete information. Just fill in and mail the coupon.

Armco Steel Corporation, 1957 Curtis Street, Middletown, Ohio

Send me information on Armco ALUMINIZED STEEL Type 2.
We manufacture:_____

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

ARMCO STEEL CORPORATION

1957 Curtis Street, Middletown, Ohio

Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

Care for Your Customer's Profit

"You know, I've always believed in the double profit system. That's where the customer, as well as the supplier, gets a profit."

The philosophy is that of Boss Kettering, long-time research chief for General Motors. It was expressed in conversation at the cornerstone laying for the Cleveland Engineering Center.

We felt that Boss Ket was expressing a basic truth—one that too often is forgotten and one about which all of us should occasionally be reminded.

Who is the customer?

To the manufacturer, it is the buyer of his goods.

To the government, it is the citizen and taxpayer.

To the corporate director, it is the stockholder.

To the employee, it is the employer.

To the editor, it is the reader.

Wise manufacturers recognize this truth. They generally succeed in giving their customers better and better products in return for a lower expenditure—measured in terms of hours of work necessary to acquire them. Manufacturers who fail to recognize the necessity of a profit for the customer fall by the wayside.

Corporations which have grown and prospered have directors who recognize that the owners must have a fair return.

The leading publications are those whose editors have given their readers the best ideas, the most possible information in the least possible reading time.

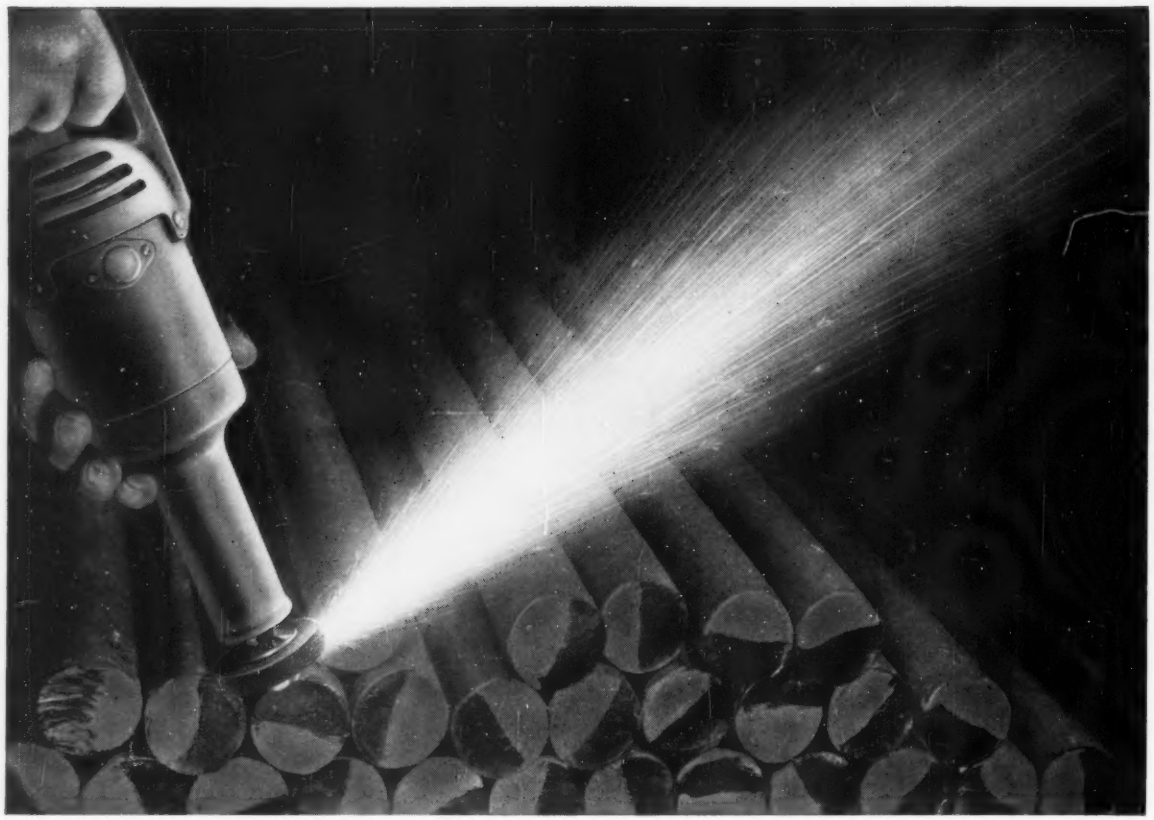
And from our observation, the employee who has prospered, has risen in stature and prestige, has been the man whose first concern was to perform the best possible service for his employer. We will bet any day on the earnest, hard working chap against the operators, the opportunists, and fast buck boys.

Boss Ket voices a homely truth that offers a profit to all who heed it—be they manufacturers, corporate directors, government officials, editors, butchers, bakers, or candlestick makers.

It could even profit the leaders of labor unions.

Walter J Campbell

EDITOR



QUALITY CONTROL REPORT

These sparks reveal vital facts about quality control of steel

You are naturally interested in the quality of your finished products—and if you use steel in making them, you should know about the Ryerson quality controls symbolized by this spark test.

Here a skilled Ryerson inspector is checking the carbon content of a steel bar by "reading" the sparks thrown off by an abrasive wheel. It's an amazingly accurate method of making sure that you get exactly the steel you order.

And this is only one of many rigid quality controls that protect you in every purchase of steel from Ryerson stocks. For example, a heat symbol identifies every bar of alloy steel to avoid the problem of variation from heat to heat. Another example: cylinder tubing can be furnished to more accurate inside diameter through Ryerson specs controlling O. D. and I. D. instead of O. D. and wall.

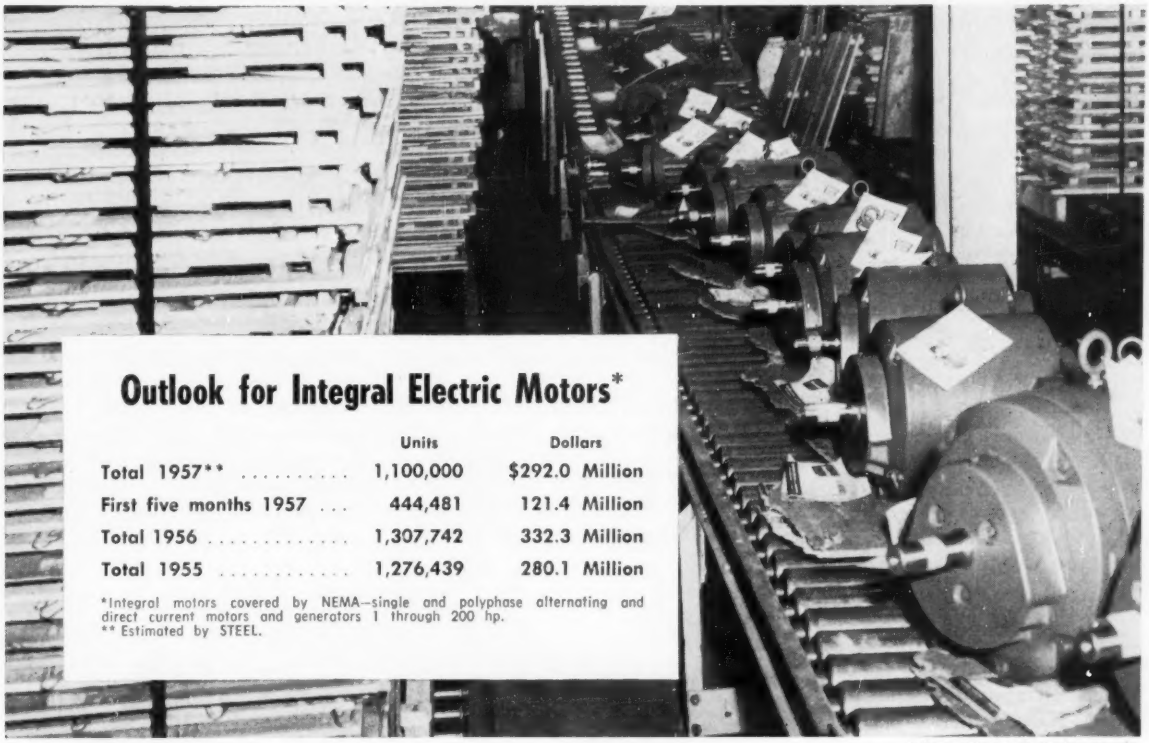
The result: steel of certified quality—assured by exacting Ryerson controls, whether your product calls for carbon, alloy or stainless steels. And these quality controls become *your* quality controls in your finished product.

These are important points to remember when you specify or purchase steel. You get extra value every time you order from your nearby Ryerson plant.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



Outlook for Integral Electric Motors*

	Units	Dollars
Total 1957**	1,100,000	$292.0 Million
First five months 1957	444,481	121.4 Million
Total 1956	1,307,742	332.3 Million
Total 1955	1,276,439	280.1 Million

*Integral motors covered by NEMA—single and polyphase alternating and direct current motors and generators 1 through 200 hp.
** Estimated by STEEL.

Reliance Electric & Engineering Co.

Transition in Integrals

Motor industry's shifts in marketing and cost relations mirror problems plaguing all metalworking. Producers stock more finished goods and mechanize to keep pace with costs

RISING labor and material costs, reduced customer inventories, and automation are posing problems to the integral electric motor producing industry. It's facing an 8 to 15 per cent decline from last year's business (see table).

"There is a definite trend toward automated facilities in our industry to reduce the labor content of our product," says Robert H. Adams, manager, marketing administration and research for the Small AC Motor & Generator Dept., General Electric Co., Schenectady, N. Y.

Automation Problem — "These facilities can produce repetitive, standard, and derivative motors on a low cost, high volume basis," he adds. However, special type motors, with modifications from standard frames, horsepower, or revolutions per minute, do not lend themselves as readily to automation.

"No longer are the historical cost relationships between standard and special motors the same."

In the larger plants, parts for standard motors, such as frames, housings, rotors, and shafts, are mass produced and move on conveyers between assembly operations.

Inventory Problem—But gains in productivity are being offset by higher inventory costs.

"A lot of customers are making severe expense reductions in their own operations," says Mr. Adams. "The whole economy seems to be consolidating the great gains of previous years; people are making do with what they have. Reduced customer inventories mean we must stock more motors and cut our manufacturing cycles to give shorter shipments."

Distribution Angle — Reliance Electric & Engineering Co., Cleveland, is "regionalizing and decentralizing" its distribution program to meet the needs of reduced customer inventories.

Says W. C. McConnell, manager, General Products Div.:

"We have opened a 15,000 sq-ft warehouse at Burlingame, Calif., which is a combination sales office with modification facilities for such items as motors, electronic panels, electric brakes, and special brackets.

"We have another at Elizabeth,

N. J., with 16,000 sq ft, much of it for storage of motors and parts. We plan to install more."

Business Is Spotty—While the industry-wide estimate puts 1957 below 1956 in sales and production, some companies are faring better than others.

Reporting increases: Lima Electric Motor Co., Lima, Ohio; Electric Specialty Co., Stamford, Conn.; Electra Motors Inc., Anaheim, Calif.; and Marathon Electric Mfg. Corp., Wausau, Wis.

Reporting decreases: Emerson Electric Mfg. Co., St. Louis; Fairbanks, Morse & Co., Freeport, Ill.; and Robbins & Myers Inc., Springfield, Ohio.

In making comparisons with its 1956 performance, Electro Dynamic Div. of General Dynamics Corp., Bayonne, N. J., reported that alternating current motors are off 30 per cent, and direct current motors are up by the same amount.

New Standards Help—The most widely used integral, alternating current motors range from 7.5 through 75 hp at 1800 rpm. The recent change in National Electrical Manufacturers Association standard from 7.5 through 30 hp has been well received. Consumers like the increased power and reduced size which facilitate shipping and installation. GE has introduced a change in 40 through 125 hp motors.

Popular direct current models range from 1 through 25 hp at 1750 and 1800 rpm.

Original equipment manufacturers purchase most of the motors for use in pumps, air conditioning units, machine tools, material handling equipment, and appliances.

Wage Costs Spiral—Most contracts with the International United Electrical workers (AFL-CIO) provide automatic wage adjustments based on the Bureau of Labor Statistics cost of living index. In addition, yearly percentage raises are provided by five-year contracts.

The BLS index has been steadily rising; this month the next fixed percentage hike is due.

"In face of fixed increases in wages, plus the rising cost of living, it appears that some increase in prices will be necessary to offset the higher costs," concludes Mr. Adams.

Boats Ride Outboard Boom

ONE OF the substantial components of the leisure market for metals (STEEL, July 29, p. 71) is the outboard motor industry. Since 1951, it has increased steadily and substantially, carrying boat and trailer sales along with it (see table).

In 1956, says the Outboard Boating Club of America, Chicago, 4.7 million outboards were in use. They range from small put-putters to streamlined luxury models in excess of 30 hp.

Fishermen traditionally provide the biggest market, having bought 60 per cent of motors and 50 per cent of boats for the last three years. But last year, reports the club, 20 per cent of the motors and 29 per cent of the boats were bought for cruising purposes.

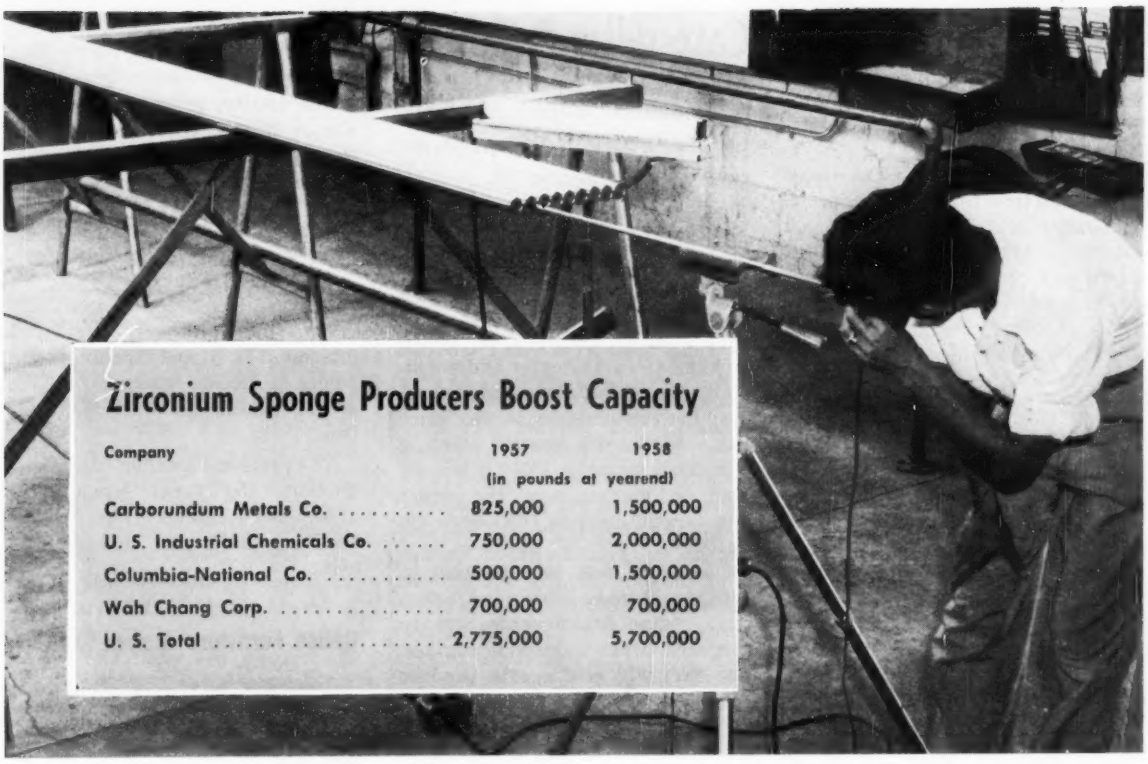
Related Sales—Howard F. Larson, director of sales, Evinrude Motors Div., Outboard Marine Corp., Waukegan, Ill., says his firm's records show that for every motor sold, $625 in additional equipment is sold. The outboard club reports that motor prices average $336.

Aluminum Co. of America, Pittsburgh, says the pleasure boat market will consume 16 million lb of aluminum in 1957 (STEEL, June 17, p. 58). The outboard club estimates that 45 per cent of all outboard boats are made of aluminum, 10 per cent of plastics, and the remainder of wood.

'Leisure' Helps Metal Fabricators*

	Millions of Dollars	Outboard Motor Sales Units	Boat Sales Units	Boat Trailer Sales Units
1957**	248	719,000	341,000	177,000
1956	217	647,000	302,000	151,000
1955	153	515,000	258,000	129,000
1954	116	479,000	223,000	103,000
1953	104	463,000	231,000	72,000
1952	70	337,000	164,000	39,220
1951	63	284,000	154,000	20,860
1950	63	367,000	131,000	18,390
1949	55	329,000	171,000	8,285
1948	73	499,000	198,000	5,700
1947	78	584,000	143,000	3,790

*Outboard Boating Club of America.
**Estimated by STEEL.



Zirconium Sponge Producers Boost Capacity

Company	1957	1958
	(in pounds at yearend)	
Carborundum Metals Co.	825,000	1,500,000
U. S. Industrial Chemicals Co.	750,000	2,000,000
Columbia-National Co.	500,000	1,500,000
Wah Chang Corp.	700,000	700,000
U. S. Total	2,775,000	5,700,000

With a Boroscope, this worker at Damascus Tube Co., Greenville, Pa., visually examines welded zirconium tubing to check size, ovality, and straightness

Zirconium To Grow in '58

Atomic Energy Commission places huge orders. Commercial applications are increasing. Prices vary widely but are dropping, reflecting decreased costs and added facilities

ZIRCONIUM sponge output in 1958 will nearly triple that of 1957. This year's production: 1.7 million lb. Principal producers are Carborundum Metals Co., Akron, N. Y., and Wah Chang Corp., Albany, Ore. (operating a Bureau of Mines installation).

U. S. capacity in 1958 will be 5.7 million lb. About 400,000 lb will be imported from Japan. The Atomic Energy Commission has contracted for nearly 3.6 million lb annually for the next five years.

Facilities Added—Capacity has grown 1.75 million lb this year, but only about 400,000 lb will be produced from it in 1957's second half. Eventually, fabrication of mill products may surpass nuclear demand, but fabricating processes and distribution techniques have not been fully developed. Some producers feel zirconium has a better long-range potential than titanium.

Columbia-National Corp. (Pittsburgh Plate Glass Co. recently acquired half interest in NRC Metals, now known as Columbia-National Corp.), Milton, Fla., will make 100,000 lb, nuclear grade, in 1957 and 800,000 lb in 1958. Carborundum Metals Co.'s plants at Parkersburg, W. Va., and Akron, N. Y., will produce 1.5 million lb in 1958, compared with 800,000 lb this year. It expects to reach capacity at Parkersburg this month.

Reactive Metals Inc., jointly owned by Mallory-Sharon Titanium Corp. and U. S. Industrial Chemicals Co., begins production in its new Ashtabula, Ohio, plant this month.

Fabrication Grows—The Pfaudler Co., Rochester, N. Y., is planning reactor vessels with capacities up to 1000 gallons. Says R. E. Avery, chief metallurgist:

"The main use for commercial hafnium-grade zirconium will be for corrosion resistant applications in the chemical industry. It has valuable versatility since it can be used for all alkalies and acids except hydrofluoric, sulfuric, and phosphoric at certain grades and temperatures. Volume of usage hinges on processes yet unused, such as high temperature hydrochloric reactions for organic chlorination."

Fabrication experience with titanium has brought about an earlier-than-expected development of zirconium fabrication. Niles C. Bartholomew, vice president and general manager, Carborundum Metals Co.,

estimates commercial grade production in 1957 at under 50,000 lb and 1958 at 100,000. Commercial production is not expected to surpass nuclear production for at least five years.

Prices Will Drop — Improved techniques tend to reduce the price of sponge, but Mr. Bartholomew says: "Volume has had a far greater influence; commercial grade sponge has been selling at $7.50 a pound; reactor grade at $7.72 and $11.42 to AEC and $9.50 a pound in 10,000 lb lots." The metal is sold in terms of pounds instead of tons.

Prices for commercial grades are reflecting lower costs growing from increased capacity. Present price: About $6.50 a pound.

U. S. Industrial Chemicals Co., Ashtabula, Ohio, using a sodium process, expects to make 2 million lb of nuclear grade next year; it will ship 1 million lb at $4.54 a pound annually to the AEC under a five-year contract. By mid-1958, USI is aiming at a nuclear range of $4.75 to $6.50, depending upon quality, for sponge metal to be sold in the form of platelets in excess of AEC volume. Hafnium-contained will be about $1.50 a pound lower or between $3.50 and $5. USI current average for nuclear grade is $7.

Properties—Gordon Kiddoo, vice president and general manager, Columbia - National Co., sees a growing demand for fabricated products because of high corrosion resistance. William C. Greenleaf, manager, metal development, notes that, for drawing and stamping, zirconium does not have the elongation advantages of stainless steel, and in forming, there may be some springback which is minimized by preheating. In machining, a heavier cut can be made at lower speeds.

Marketing — Carborundum is quoting and delivering sponge, ingots, and mill products direct to consumers. Columbia-National expects most mill products to be distributed by specialty warehouses and steel companies. There is a trend toward co-operative marketing setups between sponge producers and specialty steel companies. Pfaudler expects some steelmakers to produce mill products with their present facilities.

Caterpillar Builds

An industrial engine plant will be the first of a three-unit expansion near Peoria, Ill.

CATERPILLAR Tractor Co. is building a 500,000 sq-ft industrial engine plant on an 1100-acre site 12 miles north of Peoria, Ill.

Two more facilities—a multi-building research center and a general offices building—are scheduled for construction on the same site. When the engine plant is completed in early 1959, it will be used to manufacture the firm's two largest models (650 and 430 hp).

The plant will also be used to design and make all special industrial engine attachments and to assemble other industrial engines. The firm will continue to produce engines at its Peoria plant.

Cost of the three facilities will be about $200 million for the next three years. Expected total employment is 3500 people (1200 in the industrial engine plant.)

Builds Gage Plant

American Machine & Metals Inc. will spend $2.5 million to build a plant at its U. S. Gauge Div., Sellersville, Pa. Robert E. Lamb Inc., Philadelphia, is the contractor.

The 180,000 sq-ft structure will almost double the firm's production capacity. R. F. Stackel is factory manager.

Plan Zinc Smelter in Canada

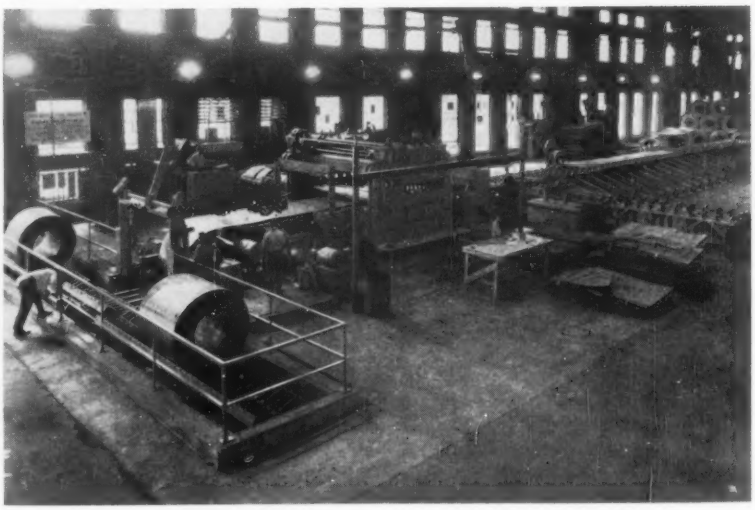
Mineral Exploration Corp., Toronto, Ont., will soon meet with interested U. S. and Canadian companies to decide whether to build a zinc smelter at Port Maitland, Ont.

The proposed smelter (daily production, 150 tons) would cost about $21 million. The custom smelter would also sell sulfuric acid.

Office Furniture Maker Expands

Columbia Steel Equipment Co. Inc., subsidiary of Standard Pressed Steel Co., Jenkintown, Pa., will add 53,000 sq ft to its Ft. Washington, Pa., plant to give it 150,000 sq ft of manufacturing and office space.

Construction will begin this month and be completed in early 1958. It is the first step in a planned expansion program.



New Line for Decoiling, Leveling, and Cutting

Plate stock, ¼ in. thick by 54 in. wide, is being leveled and cut into 40-ft lengths by this unit which can handle material up to ½ in. thick in widths up to 100 in. and in lengths up to 70 ft. The line is used by Todd-Detroit Steel Process Co., Detroit. The leveler is capable of flattening plates 1½ in. thick

Copperweld Eyes Superior

Proposed merger would put Copperweld in the stainless business and give it strip capacity. The move follows industry trends toward diversification

FOLLOWING the current trend, another merger in the steel industry is proposed.

Directors of Copperweld Steel Co., Pittsburgh, and Superior Steel Corp., Carnegie, Pa., have approved a plan that would make Superior a division of Copperweld.

Stockholders of both firms will be asked to pass on the proposal in which Copperweld would exchange three-fourths of a share of common stock for each share of Superior common.

Diversification—The merger will further diversify the production of Copperweld, whose principal tonnage product is hot-rolled bars. Its present divisions include Steel Div., Warren, Ohio; Ohio Seamless Tube Div., Shelby, Ohio; and Wire & Cable Div., Glassport, Pa.

Addition of a Superior Div. would give Copperweld capacity to produce hot-rolled and cold-rolled strip. Superior specializes in stainless steel, alloy steel, spring steel, and clad metal.

An announcement by Chairman Frank R. S. Kaplan and President James M. Darbaker of Copperweld and President Carl I. Collins, of Superior, said no personnel changes were planned.

Mr. Collins will become vice president in charge of the Superior Steel Div., and other Superior officers will be retained in appropriate management positions.

Pattern — Some other recent moves toward diversification: Jones & Laughlin Steel Corp.'s purchase of Rotary Electric Steel Co.; Carpenter Steel Co.'s offer to buy the bankrupt Northeastern Steel Corp. (which is being considered by a federal court); and the much publicized Bethlehem Steel Corp.-Youngstown Sheet & Tube Co. proposal which is opposed by the Department of Justice.

Last year, 41-year-old Copperweld had its largest net sales, $100.5 million. Net earnings were $3.4 million, 45 per cent higher than they were in 1955. In 1956, Superior's net sales were $29 million, 24 per cent below 1955's; net earnings were $689,767, compared with $1.7 million the previous year.

Copperweld's annual capacity is 660,000 tons of ingots and 508,000 tons of hot-rolled products. Superior's facilities have an annual capacity of 115,000 tons of hot-rolled strip and 80,000 tons of cold-rolled strip. It has no basic steelmaking capacity.

Gives Customers Office Service

Rolled Steel Corp., Skokie, Ill., offers its customers an "office away from the office." Two air-conditioned "hospitality" rooms, replete with receptionist to handle telephone calls and mail, are available to the firm's out-of-town customers when doing business in Chicago.

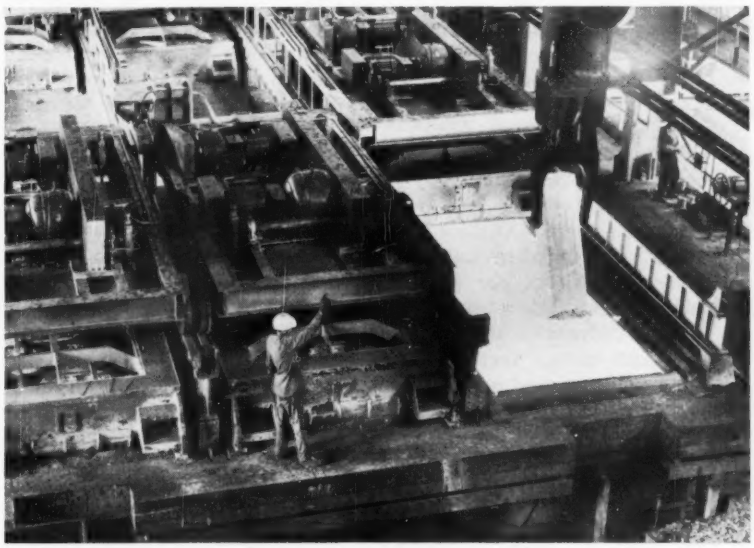
Many customers have taken advantage of the service, says Scott F. Burton, vice president, sales. The company distributes sheets, bars, plates, and structurals.

Leases Massachusetts Plant

Minneapolis - Honeywell Regulator Co., Minneapolis, leased a new $300,000 plant in Fall River, Mass., for production of a new line of electronic industrial controls. Henry F. Dever is president of the firm's Industrial Division which will operate the plant.

Hubbard Plans Research Center

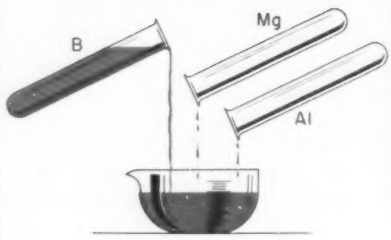
Hubbard & Co., Pittsburgh, will establish an extensive research and development center in the Chicago area, involving an expenditure of more than $1 million. The firm recently purchased Purdue University's high voltage laboratory equipment. (It will be installed in the research center.) The building will house electrical, mechanical, chemical, and metallurgical laboratories. The company makes pole line hardware and electrical protective equipment.

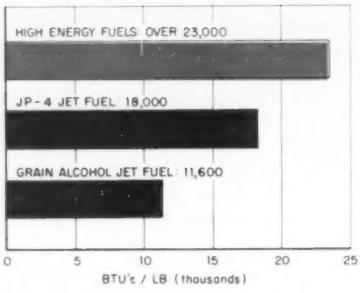


Soaking Pits Handle 6 Ton Ingots

Ingots are charged vertically into these soaking pits at the Clairton, Pa., works of U. S. Steel. Each pit is 19 ft long, 7 ft 10 in. wide and 13 ft 6 in. deep. The furnaces are top-fired with coke oven gas and can heat 14 ingots simultaneously up to 2400° F

As Metals Are Used . . . Fuels Improve . . . Aircraft Fly Farther . . .





Planes Use Metallic Fuels

WITHIN ten years, production of high energy aircraft fuel will be a $1 billion industry, predicts W. C. Foster, executive vice president, Olin Mathieson Chemical Corp., New York.

His company and others are developing chemical synthetic fuels which will give missiles and piloted aircraft greater speeds, higher altitudes, longer ranges, and heavier payloads than petroleum based fuels now permit.

Since the quality most essential to aircraft fuel is high heat value per unit weight, Air Force and industry research teams continue their quest for fuels which release more heat energy than aviation gasoline's 18,000 Btu per pound. Two which meet this requirement are Olin Mathieson's HEF-2 and HEF-3 (high energy fuels 2 and 3), now being produced on a semi-commercial basis. Backed by five years of research and two years of production testing, their heat value is more than 23,000 Btu per pound.

How They're Made — "Olin's high energy liquid fuels are manufactured by combining borax, hydrogen, and hydrocarbons under special conditions," explains Dr. L. K. Herndon, head of the high energy fuels operation at Niagara Falls, N. Y.

First shipments have been delivered to the Air Force, and within 18 months production will increase twentyfold. The AF has underwritten Olin's construction of a $36-million plant. With wider adaptations of the fuels during the next 20 years, plant capacity may increase 100 times, Dr. Herndon believes. He pointed out that other companies selected for their experience with similar chemicals will also produce the fuels.

Problems Remain—Although the Air Force has accepted Olin's product, a rather singular problem must be solved before large quantities of HEF-3 can be consumed: An engine which can burn the fuel efficiently must be developed. Once that's done, it will be necessary to reduce the cost if it's to be used in commercial aviation. While the price of HEF-3 is still classified, $1 a gallon would probably be conservative (that's 11 times as much as the cost of JP jet fuel).

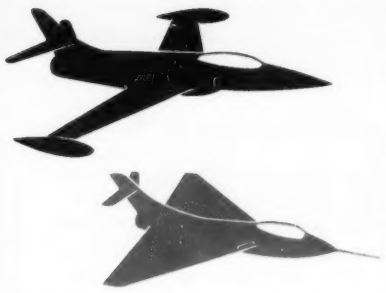
In spite of the problems, the benefits of HEF-3 more than justify its production. They include: 1. Range increases up to 50 per cent. 2. Payload increases on flights where range is not paramount, since less fuel is required to fly a given distance. 3. Increased speed on flights where conventional payloads are carried. 4. Elimination of engine failure at high altitudes, since the fuel burns easily even when air is at a minimum. 5. Flight at high altitudes where wind resistance is reduced. 6. Vertical takeoffs through greatly increased engine thrust.

At present, HEF-3 is considered to be suitable for aircraft only. Although boron's heat of combustion makes it an obvious candidate for solid fuel compositions, D. S. Dinsmoor, vice president, American Potash & Chemical Corp., Los Angeles, believes "it must still be considered in the experimental stage so far as use in a missile fuel is concerned."

Will Designs Change?—The development of high energy fuels encourages speculation along these lines: If a plane can fly 50 per cent farther on a given quantity of fuel, increasing its size would not necessitate increasing its fuel capacity. Conversely, reducing fuel requirements for a flight of a given distance would permit reducing the size of an airplane. This would increase its speed or allow its use on smaller airfields.

Current emphasis on boron notwithstanding, a spokesman for Dow Chemical Co., Midland, Mich., declares that magnesium is clearly superior to boron in thrust poten-

Designs Change



tial, which is measured by the heat energy released per pound of oxygen required in burning. In his opinion, the metal is suitable for applications where short range and high acceleration are crucial.

Additional support for magnesium comes from Phillips Petroleum Co., Bartlesville, Okla., a major producer of solid rocket propellants as operator of Air Force Plant 66, McGregor, Tex. Says Phillips: "In certain combinations, even the heavier metals such as magnesium and aluminum may be used advantageously as sources of heat for low molecular weight gases that will be expanded in the jet nozzle."

Other Metals—Although lithium has a fairly high heat of combustion (18,000 Btu per pound), it's too reactive to be used as a fuel in the elemental form, says Mr. Dinsmoor. American Potash is manufacturing two lithium compounds, the perchlorate and the nitrate, which might be used as oxidizing components in solid fuels. Beryllium (29,000 Btu per pound) appears to be disqualified because of its toxicity, scarcity, and price. Aluminum gives no more heat than carbon (13,000 Btu per pound) but merits study, in the opinion of Dr. Walter T. Olson, chief of the propulsion chemistry division, National Advisory Committee for Aeronautics, Cleveland.

Uranium: Steady Rise

Concentrate Production Grows . . .

2nd half 1955	1st half 1956	2nd half 1956	1st half 1957
	(in tons)		
1600	2600	3400	4141

As More Mills Are Added

In operation in 1956	By end of 1957	Under contract or construction for operation after 1957	Total
12	17	7	24

● FIVE NEW uranium processing mills are slated to begin concentrate production before the end of 1957. Seven more, including one pilot plant, are under contract or construction by private industry.

During the first half, the nation's 12 mills (including the government facility at Monticello, Utah) produced 4141 tons of U_3O_8.

The five new facilities include: Texas-Zinc Minerals Co., Mexican Hat, Utah; Western Nuclear Corp., Split Rock, Wyo.; Dawn Mining Co., Ford, Wash.; Union Carbide Nuclear Co., Rifle, Colo.; and Trace Elements Corp., Maybell, Colo.

Ore Reserves—Economically minable and metallurgically suited for treatment, ore reserves in the U. S. are estimated at 67 million tons. They're expected to contain an average of 0.27 per cent uranium oxide. New Mexico has the largest reserves—47.7 million tons. Five states—New Mexico, Utah, Wyoming, Colorado, and Arizona—have total reserves of about 64 million tons.

Ore Stockpiles—On July 1, stockpiles averaging 0.28 per cent of U_3O_8 totaled 1.95 million dry tons. Processing plants are treating ore at an average daily rate of 9600 tons (vs. 9000 in January).

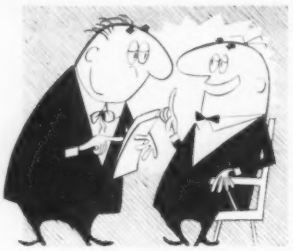
Ore receipts at all domestic plants and government purchase depots for the first six months came to 1.7 million dry tons.

Production—Mills produced an average of 690 tons of concentrate monthly for a 4141-ton first half. They processed 1,694,000 tons of ore.

Bonuses—Under the terms of Domestic Uranium Program Circular Six, $10,581,062 was paid on 832 properties as initial production bonuses through June 30. Payments for the first half amounted to $1.5 million.

Employment—About 2800 were employed in uranium processing plants in the West at midyear. An additional 5500 work in uranium mining.

Congress' Recess Doesn't Stop the Committee Work



ALTHOUGH Congress is on its way home, don't think you can expect much relief from political noises in Washington. Two committees will continue to produce plenty of news this fall: 1. The Joint Economic Committee's hearing on federal spending policies. 2. Sen. Estes Kefauver's (D., Tenn.) appointment with Bethlehem Steel Corp. in October.

Both hearings will be geared to provide live political issues for the 1958 congressional elections.

Look for the Joint Economic Subcommittee on Fiscal Policy (headed by an Arkansas Democrat, Rep. Wilbur Mills) to query economists closely about the "planned recession" (STEEL, July 29, p. 78) many observers think we are going through with present Defense Department cutbacks and tight money policies.

The full committee will check into "prices and pricemaking" after its staff reports on preliminary investigations. With administered prices being covered by Senator Kefauver's Antitrust & Monopoly Subcommittee, chances are there will be no formal hearings this year by the Joint Economic Committee.

Steel Investigation Runs Out

Senator Kefauver didn't bother to listen to Otis Brubaker, United Steelworkers of America research director, on the last day of his testimony in the steel hearings. In fact, no member of the subcommittee showed up, so Sen. John Carroll (D., Colo.) ran the show.

Mr. Brubaker continued his attack on U. S. Steel Corp., with reams of statistics showing how "well" corporation profits are, and how "sick" workers' paychecks are. The matter has degenerated into a refight of the 1956 wage negotiations. Senator Carroll suggested that the hearings be resumed in October with a round table discussion featuring Mr. Brubaker and the steel companies. Mr. Brubaker declined.

Bethlehem Steel Corp.'s executive talent will come to town in October, if the subcommittee's present schedule holds. After that, Senator Kefauver says he'll hear steel consumers, but a noticeable lack of excitement, even among staff members, prevails. No one will be surprised if no steel consumers show up.

To Make Union Reports Public

The Senate's vote to allow the secretary of labor to reveal union financial reports filed with the department could really open up a Pandora's box. It's no secret in Washington that the reports (required of all unions availing themselves of National Labor Relations Board services) are in a "shameful state," according to one observer here. The secrecy ruling has meant that many reports were never completely filled out or were incorrect.

Smathers Subcommittee Sticks to Its Guns

Filing a report on military procurement practices and small business, Sen. George Smathers' (D., Fla.) Government Procurement Subcommittee says: 1. Contracting officers continue to favor big companies over small ones. 2. The difficulty of doing business with the Defense Department tends to give large firms a break over small ones. 3. Top Defense officials don't usually practice what they preach. (They say they want to help small companies but don't convince the contracting officials they mean what they say.)

The outlook: A flood of bills to help small firms taxwise will come up early in 1958.

Navy Missile Program Stands

In line with Air Force cutbacks, the Navy will save about $90 million in fiscal 1958 by slowing down or curtailing manned aircraft production. The Navy's missile program will not be affected.

It now has two surface-to-surface missiles, two air-to-air and three surface-to-air. Procurement of two Navy air-to-air missiles (Sparrow I and II) has been terminated, or will be, as present planned production comes to an end.

Manned aircraft hit by the economy drive: Crusader, Skyray, Skyhawk, Demon, and Lockheed's W2V-1. Martin's famed Seamaster was cut back in June.

But A-Plane Program Is Hurt

Rep. Melvin Price (D., Ill.), Capitol Hill's prime advocate of atom powered aircraft, is at war with the White House over a failure to back up the A-plane project. "There is little or no systematic understanding of the program there," he says. The AF canceled its contract with the Pratt & Whitney Div. of United Aircraft Corp. Rep. Price adds that Lockheed Aircraft Corp.'s contract for the airframe will also be slowed down. General Electric Co.'s AF contract for a reactor may continue without any hitch, says one Pentagon source.

Seaway Toll Fight Shapes Up

The call has gone out on Capitol Hill: No more money for the St. Lawrence Seaway unless tolls are competitive with other transportation interests. With rising labor and construction costs, you can expect the seaway to need more money next year, too.

NEW, AUTOMATED McKAY RIM LINE SPEEDS PRODUCTION OF PRECISION WHEELS FOR TUBELESS TIRES

The advent of the tubeless tire, coupled with ever increasing labor costs, pushed wheel manufacturers to request machines that could turn out better rims at faster rates.

Because McKay Machine engineers know this business better than any other group in the nation, they accepted the challenge.

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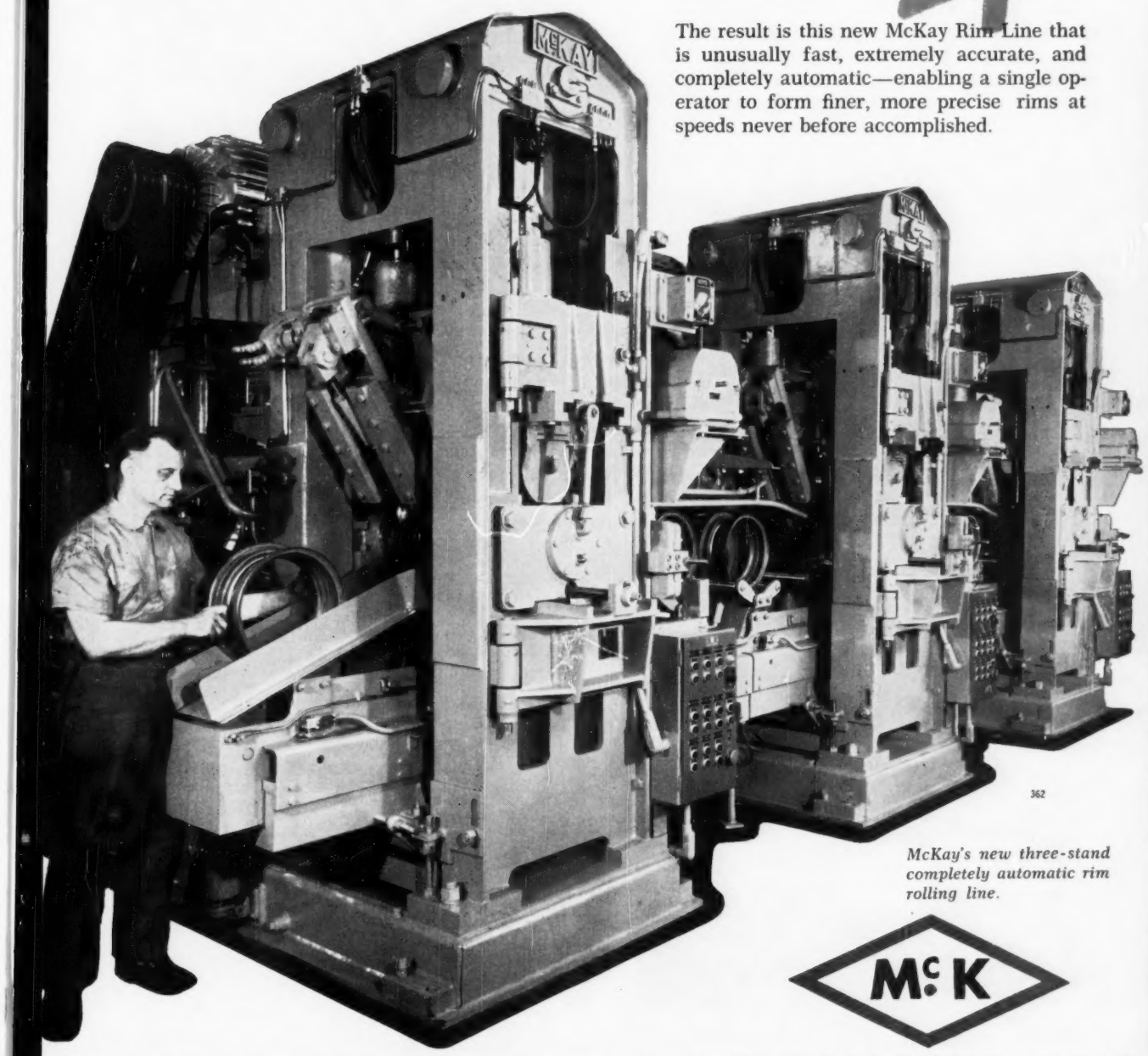
The result is this new McKay Rim Line that is unusually fast, extremely accurate, and completely automatic—enabling a single operator to form finer, more precise rims at speeds never before accomplished.



McKay's new three-stand completely automatic rim rolling line.

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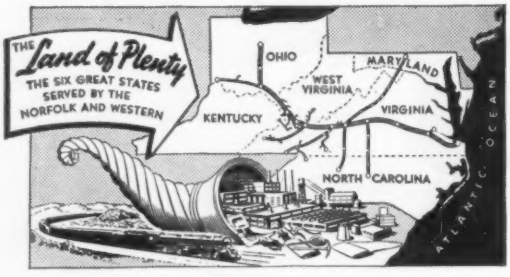
You wouldn't buy a bolt, wait until you needed it, and then go look for a nut to fit it. If you need one, you know you'll need the other.

If you decide to build a new plant, start the search for a site at the same time. Plants and plant sites are like nuts and bolts . . . you need them both, and they have to fit. Architects and builders can make them fit — *up to a certain point.* Unfortunately, they can't build manpower, nearness to markets and other vital industrial factors into your plant. So finding the right location is basic *ground*work in more ways than one. Plan your plant from the ground up. Don't wait until you're ready to build to look for a place to build — *especially when it costs you nothing to have a skilled plant location team do your groundwork.*

Plan your new plant from the GROUND UP



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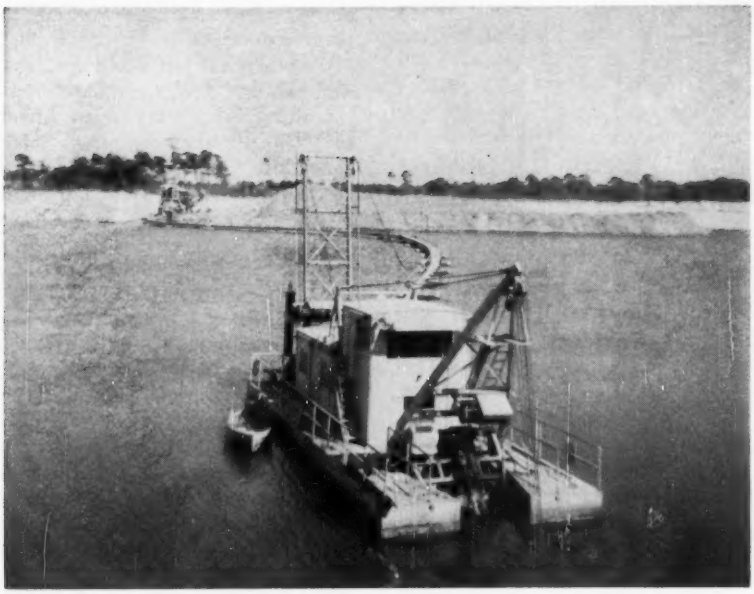


This dredge starts a continuous cycle mining operation at Winter Beach, Fla.

Hobart Produces Rutile

Scarcity and high cost of rutile prompt welding rod maker to vertically integrate back into the mining stage. Hobart Bros. Co. separates the mineral from Florida sands

A "CONSTANT FLOW" mineral separator, developed by Hobart Bros. Co., Troy, Ohio, is used to separate titanium dioxide from sand at the firm's Winter Beach, Fla., mining site.

Rutile, one of the three forms of titanium dioxide, is washed out of wave-pulverized rock along the coast of South Carolina and Georgia, carried south by the ocean current, and deposited along the protruding coastline of Florida.

Hobart's two unit, continuous cycle operation converts the ore into usable titanium dioxide, illmenite, zircon, and monozite.

Dredging—After heavy swamp vegetation is cleared, a dredge capable of handling 400 tons per hour (about 1 per cent is reclaimable material) mines the sand.

Separating — Sand is emptied into a vibrating screen separator where bulky waste is discarded. Then it flows into a series of rotating "spiders" which evenly distribute it to parallel rows of separator troughs—each with a six-barreled overflow separator. After going through four banks of separators, it reaches a concentrate of about 40 per cent. Then it's pumped to the main plant and dry staged.

Upgrading—An 80 per cent concentration is obtained by running the material in suspension over Dyster tables (an inclined table which uses boards to catch the heavy minerals while the lighter minerals flow over in suspension). After drying in long cylindrical rotating ovens, it is sent through electrostatic and electromagnetic separators for classification into rutile, illmenite, zircon, and monozite.

Uses—After packaging, the minerals are shipped primarily to welding rod manufacturers, paint producers, and the Atomic Energy Commission. Primary uses: Rutile as a weld purifier, titanium for jet engines, illmenite as a whitening agent in paint, zircon and monozite for thermonuclear furnaces and power sources.

Hobart uses most of the rutile and about half the illmenite. It uses agents to sell the excess. Says P. C. Hobart, mining consultant: "Scarcity of the minerals, plus an opportunity to produce them at lower cost and better quality, was Hobart's reason for the vertical integration." The company started mining production in 1952, but began larger operations three months ago with installation of a new dredge (see photo).

Virginia Metalcrafters Expands

Virginia Metalcrafters Inc., Waynesboro, Va., purchased the Wortendyke plant in that city. The firm will consolidate its brass foundry, gift business and that of its subsidiary, Harvin Co., Baltimore, at the new location. Expansion plans include construction of a new iron foundry.

Econolite Acquires GE Line

General Electric Co., Schenectady, N. Y., sold all assets and equipment of its traffic control business to the Econolite Corp., Los Angeles. GE's Communications Products Dept., Syracuse, N. Y., will continue to manufacture radio control mechanisms for use in electronic traffic control systems.

ODM Gives Fast Tax Certificate

Allied Chemical & Dye Corp., New York, has received a certificate of necessity from the Office of Defense Mobilization for fast tax amortization of a $11.4-million facility. It will produce uranium hexafluoride.

Under Goal 224, uranium hexafluoride is a specialized defense item produced for the Atomic Energy Commission. Eighty per cent of the facility (to be built at Metropolis, Ill.) is eligible for fast tax amortization.

Ample evidence of hoarding prompts the question . . .

Are Engineers Scarce?

Probably not, though there is disagreement. But seeming shortage prompts unethical recruiting. Here's how to keep, and make more productive, the men you have

SOME companies are hoarding engineers as they would stockpile hard-to-get raw materials. The undesirable results:

1. Too many engineers are placed on nonengineering jobs, causing inefficiency and low morale.

2. Engineers' starting wages (present average: $433) have jumped 66.5 per cent in the last seven years, while wages of production workers have risen 38.9 per cent, and the consumer price index has increased only 16.1 per cent.

3. Engineers are in danger of losing professional status.

4. Hoarding by one industry causes a shortage in another.

5. Close supervision is becoming impossible.

6. Some companies use unethical methods to entice engineers away from one another.

7. Some college recruiters paint unrealistic pictures of salaries and status. The young engineer, upon discovering the farce, becomes dissatisfied.

A recent report by students at the Harvard Graduate School of Business Administration ("Engineering Manpower—How To Improve Its Productivity") states: "Unnecessary people are being hired because management has no effective way of assessing the validity of engineering department manpower requirements."

Supply—There are about 700,000 engineers employed in the nation today, according to the National Science Foundation. If only 10 per cent of their time could be diverted from nonengineering to engineering functions, it would add more to our engineering forces than the entire graduating classes of the next two years.

Problem—But unethical recruiting continues. STEEL has received many reports of firms trying to hire four or five times as many engineers as were really needed. (Some hired twice as many as they needed.) The Harvard men report that they found several instances of engineers working in libraries (clipping technical reports from journals), filing, drawing charts and posters, and even working in plant cafeterias.

Cost—Recruiting is big business. The Harvard group estimates that recruiting costs vary from $1000 to $5000 per engineer hired. Some companies maintain permanent recruiting offices in New York and Miami.

The survey adds: "Many conventions and professional meetings have degenerated into quasi-auctions where an engineer can sell himself for the most attractive offer." Many firms have "hospitality" suites in large hotels for the interviewing of convention delegates.

Other companies send engineers out to recruit. But some have found it to be a dangerous practice. The Harvard study records seven instances in which a company fielded a recruiting team of engineers and less than half returned. The recruiters were recruited.

Solution—Many forward-looking companies are taking steps to remedy these situations. They are: 1. Hiring engineers only in the quantity needed and only with the proper background for their potential asignments. 2. Establishing programs which will enable them to hold onto their present forces. Programs offer inducements like these:

- Assignment of only engineering jobs.
- Tuition-aid programs.
- Six to eight paid holidays.
- Elimination of time clock punching.
- Insurance coverage.
- Payment of the cost of printing professional papers.
- Assignment to small work groups which have capable leaders.
- Delegation of as much responsibility as the engineer can take.
- Such assistance as technicians, clerical workers, computers.
- Opportunities for advancement, not necessarily to management but to a staff research position.
- Salaries equal to professional standing.
- Scheduled and budgeted work.
- Educational leaves of absence.
- Regular job evaluation.
- Merit review.
- Promotion from within.

Keep Him Informed—If a man is divorced from the affairs of his

company, traveling fever sets in. The engineer, because of his professional status, should be informed of all those things which affect his personal situation and which help him to feel he belongs. "Too often, we impress a man with the fact that he is a member of the team and then forget to tell him on what day the game will be played," states a report of the Associated Industries of Cleveland.

Case Study—The National Society of Professional Engineers notes that a large eastern utility company turned a shortage into a surplus. A company study showed that its more than 850 engineers spent only 45 per cent of their time on engineering work.

To correct the situation, the company took these steps: 1. Each department analyzed its distribution of engineers and their assignments to determine whether changes would provide more effective use. 2. All recommended a greater use of technicians. 3. Engineers were relieved of administrative functions which could readily be performed by nonengineers. 4. Only engineers whose background qualified them for the field in which they were needed were hired.

The company was able to decrease its engineering staff by 150, gained better productivity, and gave engineers greater opportunity for advancement.

Work Planning — The Harvard students list steps management should take in planning engineering work:

1. Make sure that engineers understand the company's product objectives.

2. Encourage suggestions, comments, and criticism. This will help management learn: Work progress, new ideas, how much support and assistance are needed.

3. Use project charts and schedules (see STEEL, July 15, p. 64).

4. Promptly appraise, evaluate, and carefully co-ordinate the material submitted by the engineering department for review and action. You will avoid blind alleys, gain opportunities for economical improvements, and save costly engineering time.

5. Periodically and systematically review all projects.

Summing Up — Conclusion by many students of the problem: The shortage of engineers is partly artificial. It will be remedied a great deal if sanity returns to their recruitment and utilization.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Use Fair Recruiting Practices

1. Hire only as many engineers as you can effectively use.
2. Offer realistic salaries.
3. Don't display the company; have the potential recruit visit your plant.
4. Promise him only such benefits as are in effect for comparable personnel already employed.
5. Offer expense accounts on a comfortable level; don't promote extravagance or "knocking down."
6. Recruit through competent and loyal personnel who know the answer.

Servel Sells Out

Company expects to sell all physical assets; plans to buy new "stable" business

SERVEL, the Evansville, Ind., firm that started business in 1902 as Hercules Buggy Co., is placing all its physical assets "on the block."

Pending stockholder approval on Sept. 11, it will sell its air conditioning division and defense division building to the Arkansas Louisiana Gas Co. for about $4 million. It is also negotiating to sell its home appliance division.

Taxes—The home appliance division has an income tax carryover of $17 million, as of Apr. 30.

Servel intends to use the proceeds from the sale "to acquire a new and different type business, of a stable character, that will afford the company and its stockholders a reasonable return on their investment."

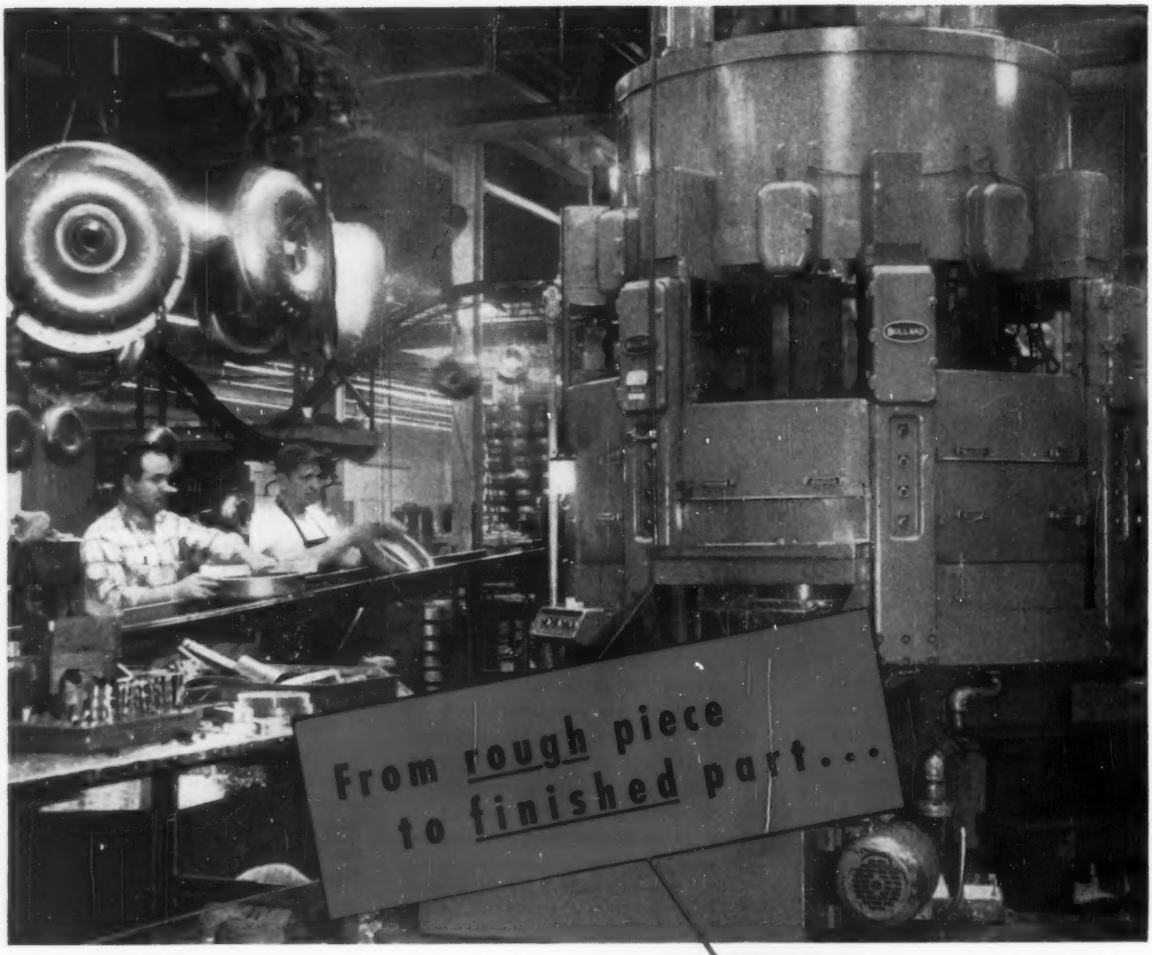
(Executives of the country's gas utility industry recently met at American Gas Association headquarters—presumably they're worried because Servel is the only major U. S. manufacturer of gas refrigerators. They would not like to see the gas refrigerator cease to exist simply because an unrelated firm wants Servel's assets to establish a tax loss.)

Made Carriages—The firm made buggies from 1902 until 1925. It also made gasoline engines and, during World War I, Army truck bodies. While building wooden cabinets and refrigeration units for a Detroit sales agency, it acquired the name Servel by shortening the company's "Serve Electrically" slogan.

And Wings—In 1927, gas refrigeration was introduced; it kept the company operating at a profit throughout the depression. During World War II, Servel made wings for Republic Aircraft Corp. planes.

Electric refrigerator sales were hurt by the bad publicity from deaths caused by poor owner maintenance of its gas refrigerators.

Sales of central air conditioning systems were stifled by the electric room unit boom. The commercial refrigeration business was sold to Goodwill Industries more than a year ago.



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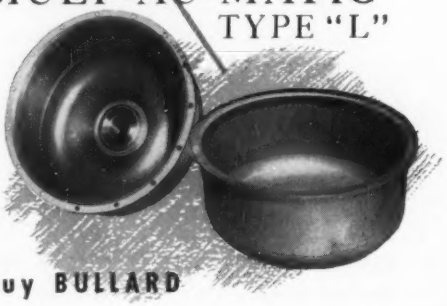
Transferred to and from the machine by roller conveyors, rough piece is loaded, completely machined and finished part is unloaded without any manual effort. The machining operations performed at seven stations include boring and counterboring, rough and finished facing, rough and finished turning, drilling and chamfering — eighteen separate operations in all.

"We went to Bullard on this job" according to the Master Mechanic of a leading manufacturer of automotive clutches, "because our program definitely called for a multiple spindle machine and the Bullard Mult-Au-Matic, Type "L" was best suited for the operation. Actually, its greater number of stations, larger spindles and greater power made it the only multiple spindle machine which fitted the job."



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Corporate Owned Manufacturing and Assembly Plants

Latin America Vehicle Sales

	1957*	1956	1955
Argentina	45,065	12,791	7,734
Mexico	48,483	49,168	40,996
Uruguay	5,652	2,802	4,452
Chile	17,523	11,251	4,402
Brazil	34,593	17,075	11,966
Venezuela	41,859	36,061	45,926
Colombia	1,773	13,981	22,650
Total	194,948	143,129	138,126

*Projected

Latin American Buildup

Red tape exasperates car builders trying to cash in south of the border, but profits make the effort worthwhile. Latin American governments want manufacturing facilities

LATIN AMERICA looks like the next big overseas expansion area for automakers.

The industrial boom in countries south of the border has boosted the demand for cars and trucks.

Several sources indicate vehicle sales in Latin America will triple by 1965. Trucks will be especially profitable because they make up almost 60 per cent of Latin American imports.

Outlook — J. Wilner Sundelson, manager of operations planning for Ford Motor Co.'s International Div., says: "The Latin American countries feel that by encouraging the development of a local automotive industry they will be able to hasten the process of general industrialization."

As imports of built-up (BU) vehicles decrease, expansion will follow this general pattern:

- Assembly of imported knock down (KD) cars and trucks.
- Manufacture of simple components for the replacement market.
- Complete parts manufacturing and assembly operations.

Hot Spots—Ford, General Motors, and Willys already have some manufacturing and assembly plants in Mexico, Brazil, Chile, and Argentina.

Chrysler Corp. recently bought a distributor-owned assembly plant in Caracas, Venezuela, to save it from liquidation. This country and Uruguay are strong sales centers.

Colombia also has been a profitable market place, but recent political maneuvers have put the kibosh on sales this year.

Other South and Central American countries, for the most part, are too small or economically unstable to support major automotive activities.

Controls—While the larger countries are eager for the added employment and income American car builders can provide, there's little doubt the expansion will be run pretty much as local governments decide.

Taxes, quota systems, and plain red tape are the common methods of controlling who's going to do what.

But for those who want to play ball, several of the countries offer attractive exchange rates and profit pictures.

Typical—Brazil wants to manufacture trucks and Jeeps locally.

A government commission which approves truck and car production projects offers special tax exemptions, land grants, and carefully controlled markets for companies that are willing to invest dollars in manufacturing and assembly facilities.

And just to make sure foreign investors get the idea, import duties on trucks are higher than those on passenger cars.

Take Hint—This year Ford and GM have started new truck manufacturing programs in Brazil.

GM plans to sink more than $10 million into an engine foundry and assembly facilities which are the first step in a continuing project.

Ford will invest $16 million in

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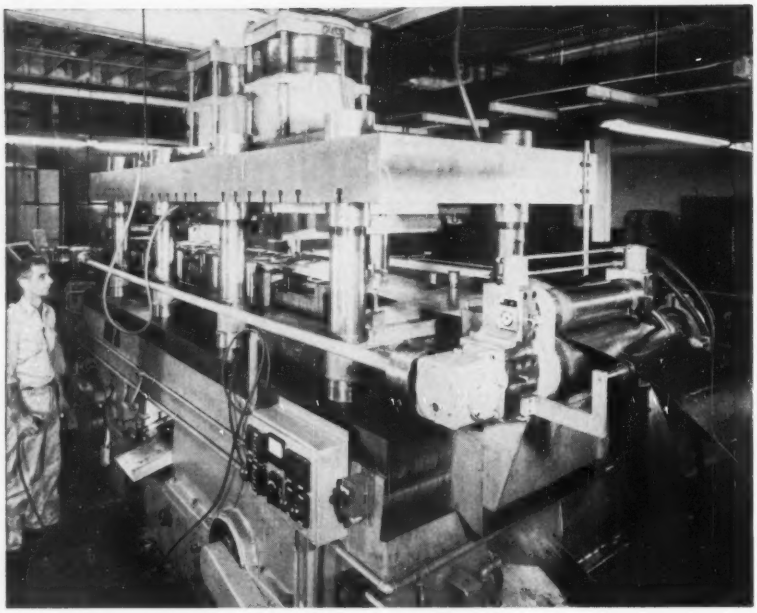


Press Whacks Out Headlight Shells

This 450-ton stamping press converts strip steel into 2000 headlight shells an hour. The machine uses progressive dies and is fully automatic. The double crank job is installed at C. M. Hall Lamp Co., Detroit

its facilities. Brazilian sources will add another $5 million to the project.

Ford will build 8250 trucks in its new Brazilian plant this year. By 1960, the company will be producing 30,000 vehicles each year. This will equal a little less than a third of the 109,000 cars and trucks the country expects to see built locally in 1960.

Trend—Brazil leaves no doubt as to which way the wind is blowing. A recent government regulation states that by 1963, 95 per cent of all components of such industrial and consumer products as cars and trucks must be manufactured in Brazil.

Mexico—Across the Rio Grande, Mexico is keeping pace with Brazil in expansion aims.

The country forecasts an annual increase of 5 per cent for its gross national product over the next ten years.

Mr. Sundelson estimates annual retail sales of automotive activities equal $350 million, some 8 or 9 per cent of Mexico's GNP.

A six-year road building program will require more trucks and make room for more cars. The country has a quota system which controls the number of vehicles each manufacturer may assemble or import.

High taxes on BUs will force car builders to bring in KD units to be assembled on the spot.

But Mr. Sundelson figures Mexico will have to continue to import at least half its trucks and cars for the next ten years until enough workers are trained to take over complicated manufacturing jobs.

Competition — Chile, Argentina, and Venezuela share the ambitions of Brazil and Mexico. The spirit of competition may help cut red tape and give manufacturers more freedom in Latin America.

Venezuela has been eyed as a possible site for the next facility buildups.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
7 Mo. Total	3,868,517	3,641,477
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
July 27	119,857	111,247
Aug. 3	119,323	111,157
Aug. 10	118,864	108,167
Aug. 17	117,598	98,348
Aug. 24	122,381†	69,676
Aug. 31	122,000*	58,233

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

First Forecasts for '58

Economists for the auto industry are predicting sales of 6.5 million cars in 1958.

This should mean production will be in the vicinity of 6.8 million cars.

George Romney, president, American Motors Corp., doesn't share this guesstimate. He says: "I may want to revise my estimate later, but at the moment I'm looking for industry sales of about 6.2 million cars."

That's about the same forecast industry heads made for this year, but it's not panning out. As things look now, the '57 production run will total 6.2 million cars —about equal to 1956.

Sales will hit close to 5.9 million.

But automakers may come closer to the 6.5 million target next year. Economists now admit they overestimated the number of credit buyers who would return to the market place this year.

If the experts are wrong again, Detroit may have to take a long, long look at its expansion plans.

Steel Buying Perks Up

Unexpected ordering is boosting steel purchases for automotive use, say steel company officials in the Detroit area.

There's no rush, but one sheet producer tells STEEL he's getting a 6 per cent boost in orders for mid-September delivery.

Reports another firm: "We are being surprised by the sizable tonnages for September delivery.

"Most of them are being updated by customers who just a few months ago said they would have nothing until October or November."

TOOL LIFE SOARED FROM 25 TO 750 PIECES

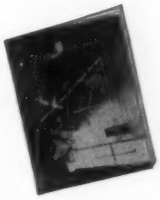
WITH ARISTOLOY LEADED

Counterboring 8 lb. forging was costly for large steering gear manufacturer

Excessive tool breakage was running into hundreds of dollars per month for a large automobile parts manufacturer. On 2.17" ID counterboring operation of this forging made from A.I.S.I. 5120, chips were long and continuous. They wrapped around the tool, fouling it and causing premature tool failure. Tool life averaged only 25 pieces per tool.

A change to Leaded Aristoloy 5117 brought about an immediate improvement not only in tool life but in increased production and vastly improved finish. Tool life was upped to 750 pieces per tool. Spindle speed was increased from 113 to 239 R.P.M. and feed from .007 to .0134 I.P.R.

If you have a problem involving counterboring or deep hole drilling, call your nearest Copperweld district office. We will be glad to have a field metallurgist, experienced in application of lead treated steels, work with you.



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FAST, continuous operation is the key to profitable automatic forging production lines. Especially in high speed heat-treating and hardening operations. They're extremely sensitive to changes in chemical composition and structure of steel used. Interruptions to make tests or adjustments slow production, increase costs, reduce the advantages of automatic operation. This makes the uniformity of the steel you use an even more vital factor. The more uniform the steel, the steadier the production and the greater the potential you can realize from your automatic equipment.

You can get the utmost in uniformity, and automatic operation—at no extra cost—by using Timken® fine alloy steel. Uniformity is constant from bar to bar, heat to heat, order to order.

We take many extra quality-control steps to assure this uniformity. For example, the Timken Company uses a magnetic stirrer for molten steel to assure equal distribution of alloys, uniform temperature and improved working of the slag. It's the first installation of its type in the United States.

To further assure uniformity, your order of Timken fine alloy steel is handled individually. We target our conditioning procedures to meet your end use requirements. Each bar is stamped to identify the heat it came from. This limits variations within an order as well as from order to order. And every heat is examined spectrometrically to insure uniform grain size.

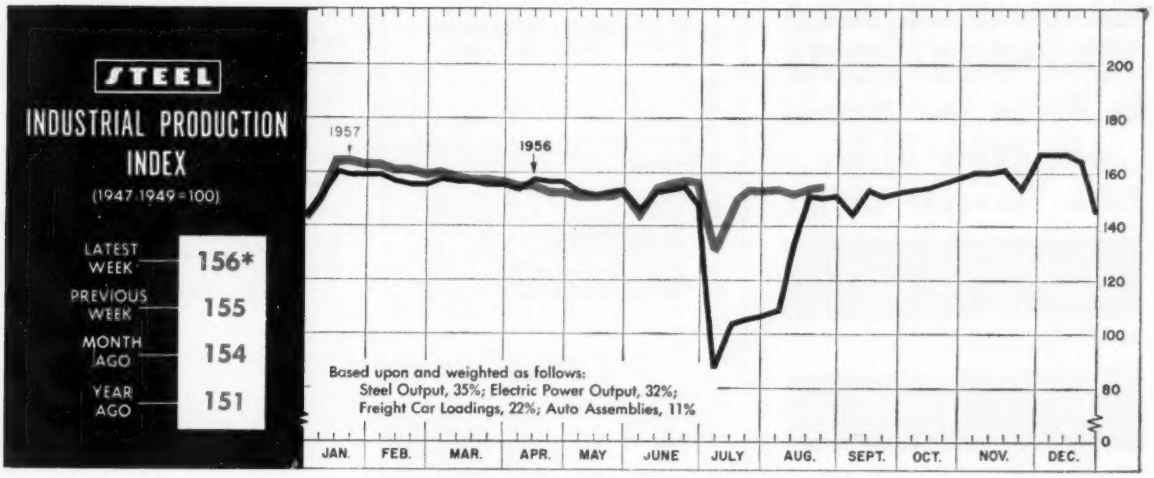
To make your automatic heat-treating and hardening operations even *more* automatic—at no extra cost—always specify Timken fine alloy steel. You'll get money-saving performance and uniform results every time. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

See the first Timken Televent hour, in color, "Eleven against the ice—story of the Antarctica Turnpike". NBC-TV, Monday night, Sept. 23.



*Week ended Aug. 24.

Capital Goods Show Signs of Pickup

NEW ORDERS for capital goods during the summer months indicate that the bottom of the dip from 1956's high level may have been reached. Producers of machine tools, foundry equipment, and industrial furnaces are reporting better business than they have seen in several months.

Machine Tools—Optimism is still dominant in the machine tool industry and probably will be until at least well into the fourth quarter. By then, builders will know whether the anticipated fall pickup materialized. Major producers contacted by STEEL are confident it will come off on schedule. Some hint of better conditions is seen in the July report of the National Machine Tool Builders' Association. Net orders climbed to $55,850,000, the highest total since March and the second monthly increase in a row. Almost as significant was the dropoff in cancellations—$3,750,000. That's the lowest figure in 21 months.

Builders are apparently pegging production to incoming orders. Shipments dropped to $58.5 million, resulting in a stabilization of backlogs at 4.2 months. Vacations contributed to some, but by no means all, the decrease in output. Last year, when backlogs were above eight months, STEEL asked tool builders what they considered to be the best backlog level. The consensus was about four months. It is likely they will exercise a certain amount of control over production to maintain that position. Shipments will continue to be pegged to new orders and will remain below first-half figures until orders pick up.

The tool builders' confidence is based on a large volume of inquiries. Industry talk has it that at least three major automotive projects are under consideration and that any one—or all three—could break soon. One report has a major auto producer putting an entirely new engine in its 1959

BAROMETERS OF BUSINESS

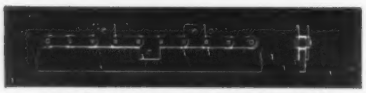
	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,132[1]	2,101	2,389
Electric Power Distributed (million kw-hr)	12,200[1]	12,409	11,340
Bituminous Coal Output (1000 tons)	9,595[1]	9,690	9,758
Petroleum Production (daily avg—1000 bbl)	6,800[1]	6,837	7,122
Construction Volume (*ENR*—millions)	$257.7	$411.9	$321.5
Auto, Truck Output, U. S., Canada (*Ward's*)	150,697[1]	146,259	88,785
TRADE			
Freight Car Loadings (1000 cars)	750[1]	751	770
Business Failures (Dun & Bradstreet)	222	265	289
Currency in Circulation (millions)[3]	$31,055	$31,069	$30,654
Dept. Store Sales (changes from year ago)[3]	+4%	+3%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,835	$19,242	$21,787
Federal Gross Debt (billions)	$271.4	$271.7	$274.9
Bond Volume, NYSE (millions)	$17.0	$17.7	$18.1
Stocks Sales, NYSE (thousands of shares)	9,922	8,800	8,893
Loans and Investments (billions)[4]	$85.8	$86.0	$86.1
U. S. Govt. Obligations Held (billions)[4]	$24.6	$24.8	$27.2
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.71
STEEL's Nonferrous Metal Price Index[6]	213.8	214.3	262.3
All Commodities[7]	118.0	118.1	114.6
Commodities Other Than Farm & Foods[7]	125.7	125.6	122.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

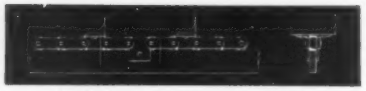
automation

YOU CAN CUT COSTS

By Moving Your Material with ACME Double Pitch Conveyor Chains

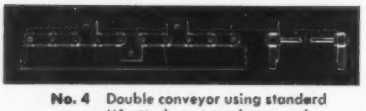


No. 1 Single conveyor using standard M35 attachment links

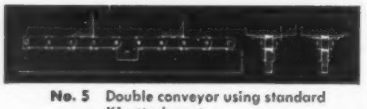


No. 2 Single conveyor using standard K1 attachment links

No. 3 Single conveyor using standard D1 or D3 pin attachments



No. 4 Double conveyor using standard M1 attachments and cross rods



No. 5 Double conveyor using standard K1 attachments

DOUBLE PITCH ROLLER CHAINS

Double pitch conveyor chains are becoming increasingly more popular in many industries where high grade finished roller chains are required, at a lower cost than the standard pitch chains. This series was developed on the basis of using standard round parts of the standard series and doubling the pitch. For example double pitch chain #C-2080 which is 2" pitch utilizes the same round parts as 1" pitch heavy series chain #80H.

In addition to being applicable for slower speed power transmission drives these chains are widely used as conveyors for the handling of materials. A standard line of attachments are available that gives this line great versatility in reference to incorporation of cross flights, cross rods, etc., that are applicable for conveyor work.

The double pitch series of chains are widely used in the Agriculture Implement, Baking Machinery, Construction Machinery, Mining, Packaging, Textile industries, etc.

Straight Side Plates, Standard Rollers

Straight Side Plates, Oversize Rollers

WRITE for Acme's latest 76 page catalog No. 10-M for complete Roller Chain Applications.

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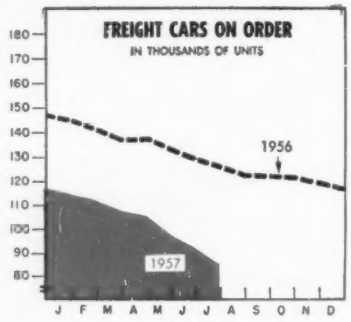
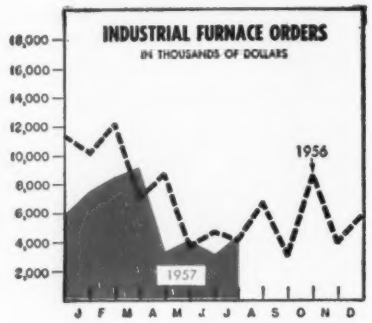
THE BUSINESS TREND





	Awards 1957	Awards 1956	(end of month) 1957	(end of month) 1956
Jan.	5,328	1,818	114,656	144,946
Feb.	6,065	1,675	111,965	141,437
Mar.	5,359	1,618	107,708	137,070
Apr.	6,429	6,559	105,190	137,436
May	3,423	2,403	97,006	133,072
June	4,918	2,859	91,810	129,409
July	1,251	2,642	85,229	126,194
Aug.	....	2,575	.....	122,870
Sept.	....	3,949	.....	122,421
Oct.	....	6,532	.....	122,250
Nov.	....	4,172	.....	119,626
Dec.	....	4,992	.....	117,320
Total	....	41,794		

American Railway Car Institute.

	1957	1956	1956
Jan.	7,380	10,244	4,973
Feb.	8,373	12,163	5,616
Mar.	9,090	7,025	7,345
Apr.	3,164	8,803	7,639
May	3,994	3,667	6,205
June	2,974	4,748	5,812
July	4,332	4,140	4,338
Aug.	....	6,722	6,273
Sept.	....	3,057	8,351
Oct.	....	8,741	9,575
Nov.	....	3,986	6,180
Dec.	....	5,858	11,105

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.

Charts copyright, 1957, STEEL.

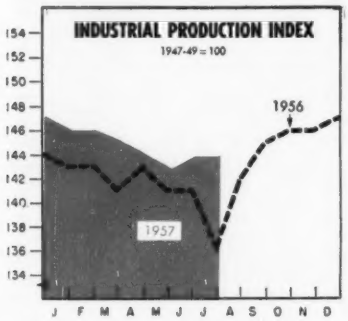
models, tooling for which would have to be ordered this fall. The cuts in Air Force spending for manned aircraft are not likely to make much of a dent in the market. Some orders might be switched around as missiles take over, but the over-all industry position will stay about even.

Foundry Equipment — This industry is hard to analyze on a monthly basis because of the effects that even one large order gained or canceled can have on it. But June represented the second highest month of the year and the second in a row to show improvement, according to the Foundry Equipment Manufacturers Association. The new order index of 187.5 (1947-49 = 100) brought the monthly average for the first half up to 143, considerably beneath the year-ago average of 169.4, but a significant improvement over 1956's second half figure of 128.7. With demand for castings remaining strong from the railroad car builders (see chart above) and signs of a pickup from the auto and appliance industries, foundries are likely to continue this level of capital spending or even increase it.

Industrial Furnaces — Although orders for this equipment during the first seven months of this year trail the comparable 1956 period by 23 per cent, three months have been better than their year-ago counterparts. (See chart and table above.) In addition, July was the best month since March and represented a substantial rebound from abnormally low June.

Material Handling Equipment— On the basis of the June report, it seems that demand for this capital equipment is dropping off. But the Material Handling Institute Inc. points out that the first half of this year experienced an over-all increase in orders, compared with a decreasing trend in the latter half of 1956. The index for the first quarter was 135.46 (1954 = 100), compared with 133.21 for the fourth quarter of 1956. Last quarter came up to 137.40. The outlook for this industry is good in view of the continuing trend toward automation.

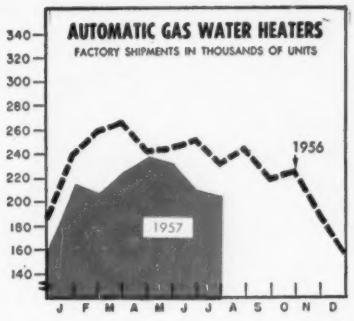
Aetna-Standard Engineering Co., Youngstown, indicates that business in the steel mill equipment industry is still at top level. With a backlog worth $22 million, the company expects to operate at full capacity during the fiscal year which began in July.



(Seasonally Adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1957	1956	1957	1956	1957	1956
Jan.	146	143	144	148	180	170
Feb.	146	143	143	146	180	168
Mar.	145	141	137	145	179	167
Apr.	144	143	136	146	176	170
May	143	141	132	141	175	167
June	144	141	132	136	177	168
July	144*	136	134*	69	178*	169
Aug.	...	142	...	124	...	172
Sept.	...	145	...	148	...	176
Oct.	...	146	...	147	...	177
Nov.	...	146	...	147	...	180
Dec.	...	147	...	145	...	183
Avg.	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.



	Shipments—Units		
	1957	1956	1955
Jan.	214,900	239,000	210,900
Feb.	208,200	259,200	228,400
Mar.	226,600	267,500	263,100
Apr.	238,200	241,200	245,200
May	233,600	244,300	229,400
June	210,700	251,500	227,100
July	206,400*	231,900	219,300
Aug.	.....	243,500	275,600
Sept.	.....	218,100	237,100
Oct.	.....	224,700	231,200
Nov.	.....	184,400	195,500
Dec.	.....	156,800	185,400
Totals ...	.....	2,762,100	2,748,200

*Preliminary.
Gas Appliance Mfrs. Assn.

Appliances Begin Uptrend

There's more bullishness in the appliance industry today than there has been in many months past. Most major appliance manufacturers are recalling personnel laid off earlier in the year; some are hiring additional workers. Typical of the attitude is that of John M. Otter, executive vice president of marketing for Philco Corp. He expects higher sales and higher earnings for his company in the coming months. He is most optimistic about home laundry equipment.

TV and radio sales are improving. Manufacturers' shipments to dealers in June (382,699 units) improved markedly over those in May and were nearly equal to the number shipped in June, 1956. Radios continue to set a hot pace, with June shipments to dealers totaling 765,719 units, a near record quarter of a million more than in May, reports the Electronic Industries Association.

Failures Down; Charters Up

Business failures in July continued the seasonal downtrend, reaching 1059 casualties, according to Dun & Bradstreet Inc. This was off slightly from June but still a bit above the July, 1956, figure. Business incorporations in July (11,686 firms) rose above the year-ago month for the first time since last January and exceeded the June figure. So far this year, 8148 businesses have folded, while 83,770 have opened their doors for the first time.

Trends Fore and Aft

• Sales of farm machinery by Oliver Corp., Chicago, are about 4.5 per cent ahead of last year's, declares J. R. Covington, vice president and secretary. Mr. Covington is bullish on the farm equipment outlook, reasoning that "more food must be raised for more people from the same amount of land by fewer persons using much more machinery."

• The backlog of orders for fabricated structural steel fell another 82,000 tons in July as bookings slipped to 202,772 tons and shipments remained substantially higher at 303,512 tons. Even at 3,137,526 tons, unfilled orders were 9 per cent higher than the year-ago total, says the American Institute of Steel Construction Inc.

Cold Heading Cost Savings

Actual Cost Cuts As High As 70%

The most important consideration we can point out to the designer or purchaser of fasteners and small parts is that any part which can be machined from rod stock is also potentially available from the cold heading manufacturer. This technique offers speed of production, without scrap loss, plus superior strength and appearance for low cost and high design efficiency.

The designer need not be restricted to standard fastener sizes when they do not meet the requirements of his application. It is often much less expensive to specify a rivet, nail or screw to meet the task exactly as the application requires, than it is to compromise its function for the sake of "standards." While there is nothing mysterious about the cold heading process, experience has proved it to be of inestimable value for getting maximum quality and output at a minimum cost. While the really spectacular advantages in cost show up in runs of several thousand pieces, we are also able to take care of short run requirements. We welcome and expect manufacturers to come to us for advice and assistance concerning their fastener problems.

Given complete specifications, including a drawing and an idea of the application, we can quickly tell you whether or not it will be advantageous to have your fastener or part JOB-DESIGNED by HASSALL. The remaining important aspect of our service to you is the ability to get into production quickly and make prompt shipment.

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Four "U" Type SPEED NUTS hold the weather-tight steel cover firmly in place. SPEED NUTS eliminate the need for welding, staking or tapping. Self-retained, they stay in position even when the cover is removed for inspection or servicing. They "float" in the panel to offset hole misalignment. And because of their unique design, SPEED NUTS never rust or freeze to screw threads even under prolonged outdoor exposure.

This is a prime example of the advantages gained by designing with SPEED NUT Brand Fasteners in mind. Peak fastening efficiency is built in—no need to invest in high-cost tooling at the start, or to make revisions to cut costs later. Call in your Tinnerman representative now to discuss your new design projects. He can help you save time and money without sacrificing product quality. His office is listed in most major telephone directories. Or write to:

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A. F. ANZLOVAR
Mercast Mfg. v. p.-gen. mgr.

ROBERT O. WILDER
National Forge president

VICTOR EMERY
Aeroquip sales position

JOHN J. KNOX
Reading Tube purchasing agent

A. F. Anzlovar was elected vice president and general manager, **Mercast Mfg. Corp.**, La Verne, Calif., a subsidiary of Mercast Mfg. Corp. of California and an affiliate of Atlas Corp.

Robert O. Wilder, executive vice president, **National Forge & Ordnance Co.**, Irvine, Pa., was elected president to succeed **John C. Harrington**, now chairman. **Duance E. Wilder**, secretary-treasurer, assumes added duties of vice president.

Enthone Inc., New Haven, Conn., appointed **Edward F. Foley Jr.** production manager and purchasing agent; **Lawrence J. Durney**, manager of product development; **William K. Murray**, manager of technical service.

A. H. Ingley, vice president-manufacturing, **Diamond Alkali Co.**, Cleveland, fills the new post of senior vice president. **James A. Hughes**, treasurer, advances to vice president-administration, also a new post. **R. H. Armor** was elected treasurer. **Donald S. Carmichael**, secretary, was named to the additional post of general counsel.

J. P. Henry was appointed vice president-general manager of sales of **Ampco Metal Inc.**, Milwaukee, a newly created post. He was the firm's general sales manager.

Lowell S. Bransford was made production supervisor; **Dow E. Slagle**, purchasing agent at the Gainesville, Tex., plant of **National Supply Co.**

Victor Emery was named manager-manufacturers sales, industrial division, **Aeroquip Corp.**, Jackson, Mich. He was marine sales manager and is succeeded by **James I. Mellencamp.**

Frederick H. Norton was elected vice president - sales, **Pittsburgh Forgings Co.**, Coraopolis, Pa. He was sales vice president of American Car & Foundry Div., ACF Industries Inc. **Walter H. Stocking**, vice president of Pittsburgh Forgings, was elected executive vice president. **William E. Latta** was made manager of the forge division-Coraopolis plant.

Reliance Electric & Engineering Co., Cleveland, appointed **John L. VanNort** regional sales manager for the midwest. He is succeeded by **Robert O. Gee** as manager of application engineering. **George E. Law** replaces Mr. Gee as manager of service. **William C. McConnell**, manager of standard products in the marketing division, becomes manager of general products. At the Ivanhoe Div., **Frank R. Terrant** was made assistant manager of engineering.

Robert H. Isenberg was made plant metallurgist; **John I. Orrison**, assistant plant metallurgist at the Monessen, Pa., Works of **Pittsburgh Steel Co.**

At Detroit, **Reynolds Metals Co.** named **Robert J. O'Grady** regional sales manager-automotive; **Frederick W. Zinnbauer**, automotive engineer; **Ralph L. Harris**, regional sales promotion manager.

John J. Knox was named purchasing agent of **Reading Tube Corp.**, Reading, Pa., He was purchasing director for Hubeny Bros. Inc.

Robert R. Johnson, vice president-general manager of Leader Iron Works Div., Decatur, Ill., **Standard Steel Corp.**, was elected a vice president of the parent firm. **K. G. Thies**, sales manager of Standard Steel, was appointed contract administrator. **Webb L. Nimick** was named general sales manager in charge of the process equipment and special fabrication division. **Wesley V. Davidson**, assistant sales manager, road machinery division, was advanced to general sales manager of that division.

Frank J. Zielsdorf fills the new post of director of planning at **Oliver Corp.**, Chicago. He was plant manager at York, Pa., for the A. B. Farquhar Div.

Vestal W. Wiseman was made plant superintendent, **Gulf States Tube Corp.**, Rosenberg, Tex., subsidiary of Michigan Seamless Tube Co.

Dr. Wilbur G. Malcolm, former vice president - marketing, was elected president and chief executive officer of **American Cyanamid Co.**, New York. **Kenneth C. Towe**, former president, is now chairman.

Joseph W. Gallagher was made manager of marketing, special products division, **Lord Mfg. Co.**, Erie, Pa.

Dwight A. Bessmer, vice president of **Timken Roller Bearing Co.**, Can-

ton, Ohio, was elected executive vice president.

Dr. John H. Hoke was made supervisor of the stainless steels section, central research laboratory, **Crucible Steel Co. of America**, Pittsburgh.

William W. Palmquist was named chemical products marketing manager by **National Carbon Co.**, division of Union Carbide Corp., New York. He succeeds **C. E. Ford**, named to the new post of new products marketing manager of National Carbon.

Dana Corp., Toledo, Ohio, appointed as assistant chief engineers: **R. R. Furney**, clutch division; **M. M. Schall**, hydraulic transmission division; **R. E. Fletcher** and **Carl Gustafason**, mechanical transmission division.

John H. Williams was made manager of the Los Angeles office of **Torrington Co.** to succeed **William B. Candler**, now assistant sales manager, bearings division, at Torrington, Conn.

W. R. Grace & Co., New York, elected **Hermann Becker-Fluegel** an assistant vice president. He will supervise sales and purchases for the ore and metal department.

G. Cameron Harvey joined the application engineering staff of **Hydro-Line Mfg. Co.**, Rockford, Ill. He was engineering co-ordinator for Greenlee Bros. & Co.

Myron L. McCartney was named works manager, distribution transformer department, **Westinghouse Electric Corp.**, at Sharon, Pa. He succeeds **C. E. Hutchison**, named works manager of a transformer plant under construction at Athens, Ga.

AmForge Div., American Brake Shoe Co., New York, appointed **Francis W. Holbrook** marketing manager; **George L. Essig**, sales manager.

Parker Jameson, with headquarters in Dallas, was named by **Republic Drill & Tool Co.** as its district sales manager for the Texas territory. Republic Drill is a division of Avildsen Tools & Machines Inc.

CARL K. SHANK | EDWIN RHODES | RICHARD KAISER

Dodge Mfg. Corp. assignments

Dodge Mfg. Corp., Mishawaka, Ind., promoted **Carl K. Shank** from general superintendent of manufacturing to works manager. **Edwin Rhodes** was made purchasing agent. **Richard Kaiser** was made plant engineer, succeeding **Paul Jordan**, who was promoted to the new post of director of engineering.

Surface Combustion Corp., Toledo, Ohio, elected as vice presidents: **E. P. Heiles**, controller; **C. Cone**, chief engineer, industrial divisions, Toledo; **J. I. Trimble**, chief engineer, Janitrol Divisions, Columbus, Ohio.

C. Vincent Sciullo was made assistant manager, cold heading machinery division, **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn. He was Cleveland district sales manager.

Fred Barish, manager of the Los Angeles office of **Luria Bros. & Co. Inc.**, will become associated with the New York office in November.

Roy D. Allen was made chief metallurgist at **Republic Steel Corp.'s** South Chicago, Ill., district. He succeeds **Andrew G. Forrest**, recently named assistant to the chief metallurgist in Cleveland.

Thomas E. Clagett was made Detroit district sales engineer for **Wickes Machine Tool Div.**, Wickes Corp. He succeeds **J. A. Oeming**, now sales manager, machine tool division.

John S. Worth and **Thomas G. Foulkes** were appointed metallurgical engineers on the staff of S. J. Cort, operating vice president of **Bethlehem Steel Co.**, Bethlehem, Pa. **Albert P. Spooner**, chief metallurgical engineer-steel division, and **Nevil Greenwell**, assistant to manager of research, have retired.

Frederic Shonnard was made superintendent of **Crucible Steel Co. of America's** warehouse in Syracuse, N. Y.

Cochrane Corp. elected **Joseph R. Denton** vice president, New York district sales. He has been manager of the New York district sales office since 1954.

George W. Petruck, service manager for **Clearing Machine Corp.**, division of U. S. Industries Inc., Chicago, transferred to the sales staff.

Dexter Folder Co., Pearl River, N. Y., appointed **Ralph F. Mertz** sales engineer for its metal sheet feeders and related equipment.

Rotary Lift Co., division of Dover Corp., assigned **Charles E. Redding** to its Detroit factory division. He was at the home office in Memphis, Tenn.

Frank E. Cooper was made purchasing agent at **Kaiser Steel Corp.'s** fabricating division, Montebello, Calif.

Charles P. Burns was appointed to the Detroit sales staff of **Mill Strip Products Co.**, Detroit, and **Korhumel Steel & Aluminum Co.**, Evanston, Ill. He was office manager at Detroit of Pittsburgh Steel Co.

Motch & Merryweather Machinery

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PREVENTIVE THERAPY

...the next "patient" can be your casting

Trained radiographers x-ray Thermalloy castings, such as pots and muffles, completely . . ; not just at points of expected stress. *All* Thermalloy castings must pass x-ray inspection, surface tests or pressure tests, where experience indicates that stress can be normally expected.

Let us work with you on heat-treat problems. Our engineers can help you select the right grade of Thermalloy high-heat-resistant alloy and proper casting techniques for your particular application. Electro-Alloys has complete metallurgical and physical test labs, and works closely with the extensive headquarters research facilities of American Brake Shoe Company.

Call your nearby Electro-Alloys representative, or write for Thermalloy application bulletin T-225. Electro-Alloys Division 8049 Taylor Street, Elyria, Ohio. *Reg. U. S. Pat. Off.

HEAT-RESISTANT CASTINGS • RADIANT TUBES
MUFFLES • RETORTS • CONVEYOR BELTS • TRAYS

AMERICAN Brake Shoe COMPANY **ELECTRO-ALLOYS DIVISION** Elyria, Ohio

DANIEL R. CHESTER
Archer-Daniels-Midland post

JOSEPH M. JOHNSTON
Victoreen Instrument v. p.

DONALD W. MacLEOD
Elgin abrasives div. post

FRANK E. WHYTE
SKF gen. purchasing agent

EARL C. DAVIS
Parker Appliance promotion

JAMES J. BARRETT
B&W extrusion sales mgr.

Co. appointed **Clarence W. Raufus** assistant district manager of the Cincinnati sales office.

Frank E. Whyte was appointed general purchasing agent of **SKF Industries Inc.**, Philadelphia.

Earl C. Davis was made sales manager, industrial hydraulics division, **Parker Appliance Co.**, Cleveland. Before joining Parker in 1955, he was with Hydreco Div., New York Air Brake Co.

John R. Poyser Jr. was made works manager, **Leece-Neville Co.**, Cleveland.

John R. Perkins fills the new post of assistant to the president in charge of market development for **McDowell Co. Inc.**, Cleveland. He was with Delco Products Div., General Motors Corp.

Ralph R. Calaceto was made manager and sales engineer, Process Equipment Div., **Automotive Rubber Co. Inc.**, Detroit. He is at New York.

James J. Barrett was made manager of extrusion sales, tubular products division, **Babcock & Wilcox Co.**, Beaver Falls, Pa.

R. E. Esch, general manager, international division, **Vickers Inc.**, Detroit, was elected a vice president.

Frank Mosko was made sales manager of **David W. Murray Co.**, Cleveland. He was assistant to the first vice president, Aetna Standard Engineering Co., Pittsburgh.

Norman T. Shideler was elected president of **Insul-Mastic Inc.**, newly acquired subsidiary of Pittsburgh Coke & Chemical Co., Pittsburgh, which is producing for the protective coatings division. **Arthur E. Gray** was named to succeed Mr. Shideler as the division's general manager.

Maj. Gen. Marshall S. Roth, USAF, ret., was appointed assistant to the president of **Richards-Wilcox Mfg. Co.**, Aurora, Ill.

Archer-Daniels-Midland Co.'s foundry products division, Cleveland, appointed **Daniel R. Chester** manager, core binders. He was manager of technical service.

Joseph M. Johnston was elected vice president-manufacturing, **Victoreen Instrument Co.**, Cleveland. He was operations superintendent of both instruments and components divisions.

Donald W. MacLeod was made sales supervisor in charge of **Elgin National Watch Co.'s** Elgiloy, the abrasives division's industrial spring alloy. He is at Elgin, Ill.

Patrick V. Gallagher was elected vice president, **Dwight-Lloyd Division**, McDowell Co. Inc., Cleveland. He was chief engineer.

OBITUARIES...

H. B. Spackman, 58, president and chief executive officer of **Lyon Metal Products Inc.**, Aurora, Ill., died Aug. 20.

William E. Caldwell, 73, chairman, **Cleveland Twist Drill Co.**, Cleveland, died Aug. 23.

Harold C. Hurtt, 44, assistant to the vice president-sales, **Cleveland Twist Drill Co.**, died Aug. 23.

John S. Conway, 51, sales vice president of design, manufacturing, and sales division, **Koehring Co.**, Wilwaukee, died Aug. 17.

Fred J. Coulton, co-founder of **City Pattern Foundry & Machine Co.**, Detroit, and its secretary-treasurer, died Aug. 13.

Charles R. Holzworth, 70, who retired last year as president of **Tonawanda Iron Div.**, American Radiator & Standard Sanitary Corp., died in Buffalo Aug. 19.

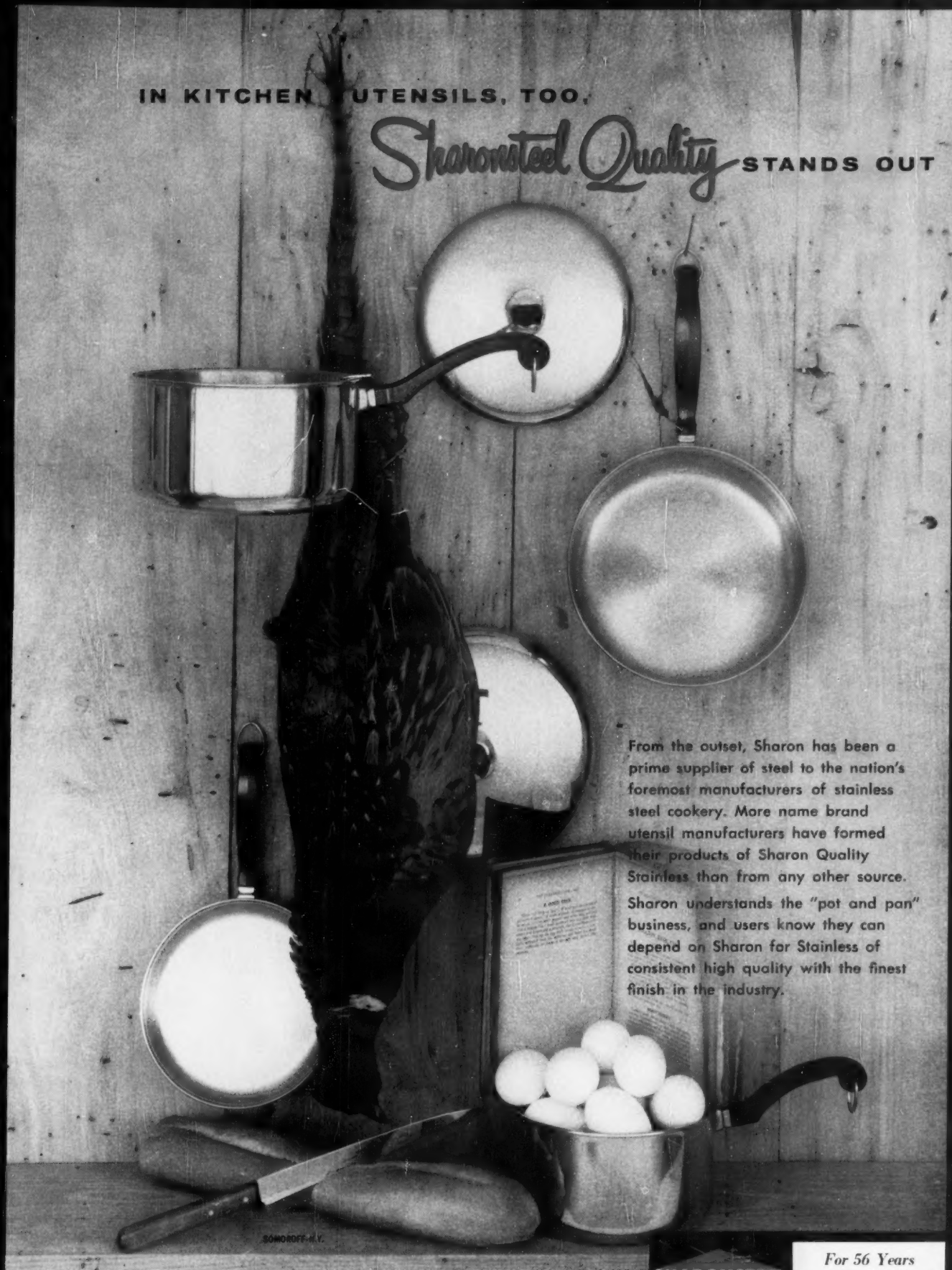
C. C. Smith, 80, president, Waukesha Foundry Co., Waukesha, Wis., died Aug 15.

Harold H. Johnson, director of research, **National Malleable & Steel Castings Co.**, Cleveland, died Aug 22.

David C. Maxwell, 52, general superintendent of manufacturing at General Motor Corp.'s **Chevrolet** plant in Buffalo, died Aug. 18.

IN KITCHEN UTENSILS, TOO,

Sharonsteel Quality STANDS OUT



From the outset, Sharon has been a prime supplier of steel to the nation's foremost manufacturers of stainless steel cookery. More name brand utensil manufacturers have formed their products of Sharon Quality Stainless than from any other source.

Sharon understands the "pot and pan" business, and users know they can depend on Sharon for Stainless of consistent high quality with the finest finish in the industry.

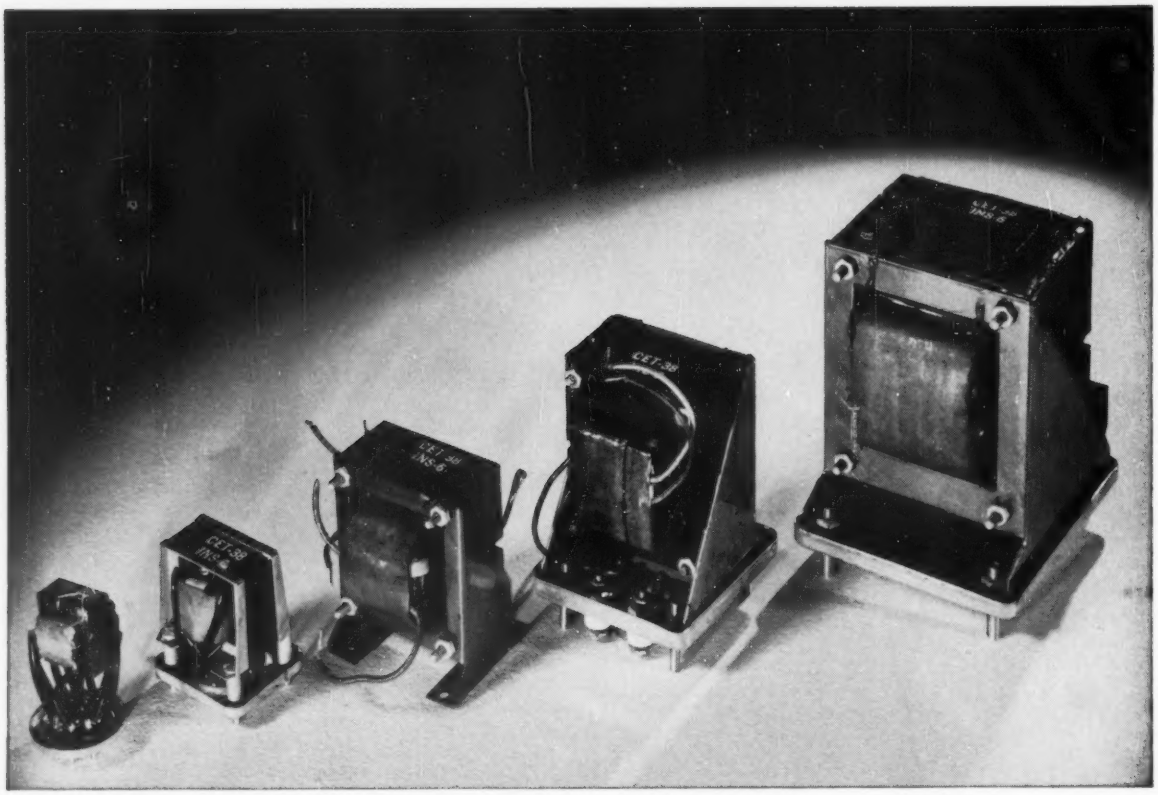
SHARONSTEEL

For 56 Years a Quality Name in Steel

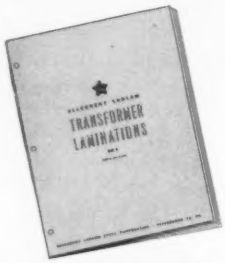
CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, SEATTLE, MONTREAL, TORONTO

169

SHARON STEEL CORPORATION, SHARON, PENNA.



A Transformer becomes a precision device with Allegheny Magnetic Materials in the core



Write for your Copy

"TRANSFORMER LAMINATIONS"

84 pages of valuable technical data on standard and custom-made laminations from all grades of Allegheny Ludlum magnetic core materials. Prepared from carefully checked and certified laboratory and service tests —includes standard dimensions, specifications, weights, etc. Sent free on request . . . ask for your copy.

ADDRESS DEPT. S-93

★ **ALLEGHENY SILICON STEEL**

★ **ALLEGHENY 4750**

★ **ALLEGHENY MUMETAL**

The operation of a transformer is no better than the magnetic core around which it is built. With Allegheny magnetic materials in the core, you get the *best*—uniformly and consistently.

Sure there are reasons why! For one thing, there's the long experience of a pioneer in development and quality control of electrical alloys. But most important, the A-L line offers complete coverage of any requirement you may have, any service specification. It includes all grades of silicon steel sheets or coil strip, as well as Allegheny Silectron (grain-oriented silicon steel), and a wide selection of special high-permeability alloys such as Allegheny 4750, Mumetal, etc.

In addition, our service on magnetic materials includes complete lamination fabrication and heat treatment facilities. What's more, this extensive experience in our own lamination stamping department is a bonus value for all users of A-L electrical sheets or strip. ● Let us supply *your* needs. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

STEELMAKERS to the Electrical Industry

Allegheny Ludlum

WSD 5333

AL
STEELS FOR THE ELECTRONIC AGE

Broadens Research

Expanded facilities for study of refractory materials being built by Harbison-Walker

STUDY of highly refractory materials and the development of processes for converting them into industrial products will be intensified at a $1-million research center being built by Harbison-Walker Refractories Co., Pittsburgh.

The company has expanded activities into new refractory product fields (mullite, silicon carbide, and zircon), and its new facilities in several foreign countries have made additional raw materials of great promise available, says Earl A. Garber, president. Harbison-Walker has diversified into the manufacture of molding media or investment materials (for shell molding and precision casting) and magnesium chemicals.

New Fields—Research on refractory monoliths will be intensified to broaden established markets. The use of refractory castables and gunning materials for rocket launching sites and jet aircraft maintenance areas is closely related to the products used for lining catalytic cracking and reforming units in the oil refineries. The company's role in nuclear energy also will be explored more fully.

Laboratory manager for the research center will be D. F. Stock. R. E. Birch is director of research; and E. Ruh, assistant director.

Koppers Gets McLouth Contract

McLouth Steel Corp., Detroit, awarded a contract to Koppers Co. Inc., Pittsburgh, to design and install a gas cleaning system at its Trenton, Mich., plant. It's for the firm's oxygen process steel installation.

Gardner-Denver Expands

Gardner-Denver Co. has completed the major part of an extensive expansion of foundry facilities at its main plant. Additions include: A new brass foundry; new sections in the iron foundry for cleaning castings and floor molding work; a core oven room; lockers and washup facilities. The building and equipment involved an outlay of some $500,000.

Installs Sendzimir Mill

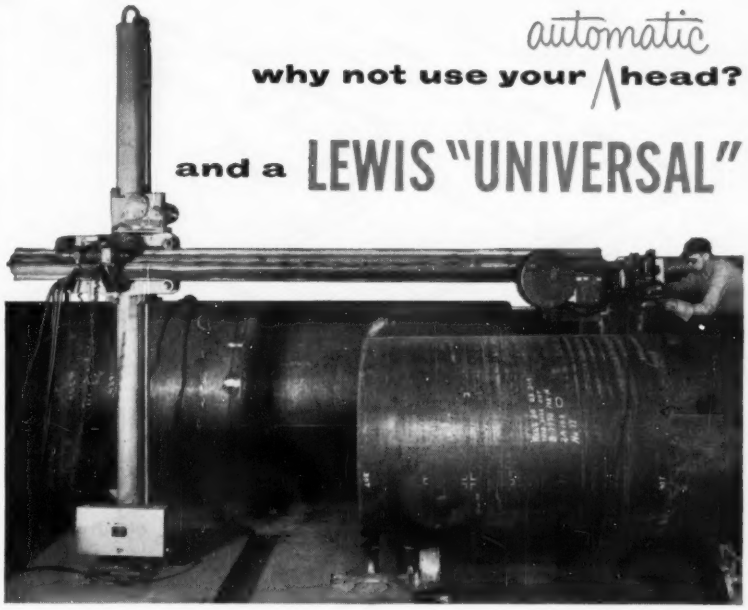
Eastern Stainless Steel Corp. will soon start full scale operations on its new Sendzimir mill and supporting equipment at its Baltimore plant. The installation is expected to increase the mill's annual production by about 50 per cent. The cold reducing mill produces stainless steel up to a maximum width of 48 in. and from 0.078 in. down to a present minimum of 0.007 in.

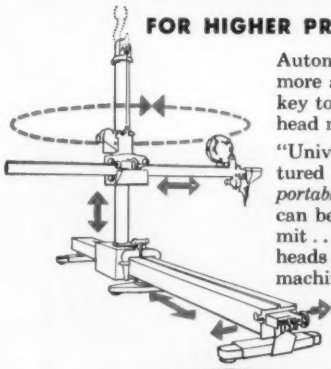
Will Process Stainless Scrap

Stainless & Alloy Corp. of America has been organized for the processing of nickel-bearing scrap metals. The firm purchased the plant and equipment of Stainless Scrap Corp., Greenville, Pa. The main office is at 741 South Ave., Youngstown, Ohio. Additional facilities, primarily in the melting and analysis departments, are planned. Officers are: President, L. A. Kirtz; vice president-operations, F. A. Travis; vice president-

(*Please turn to Page* 118)

automatic
why not use your head?
and a LEWIS "UNIVERSAL"





FOR HIGHER PROFITS WITH AUTOMATIC WELDING

Automatic welding cuts costs because it is faster, more accurate, more dependable. But . . . the real key to greater savings lies in the automatic welding head manipulator.

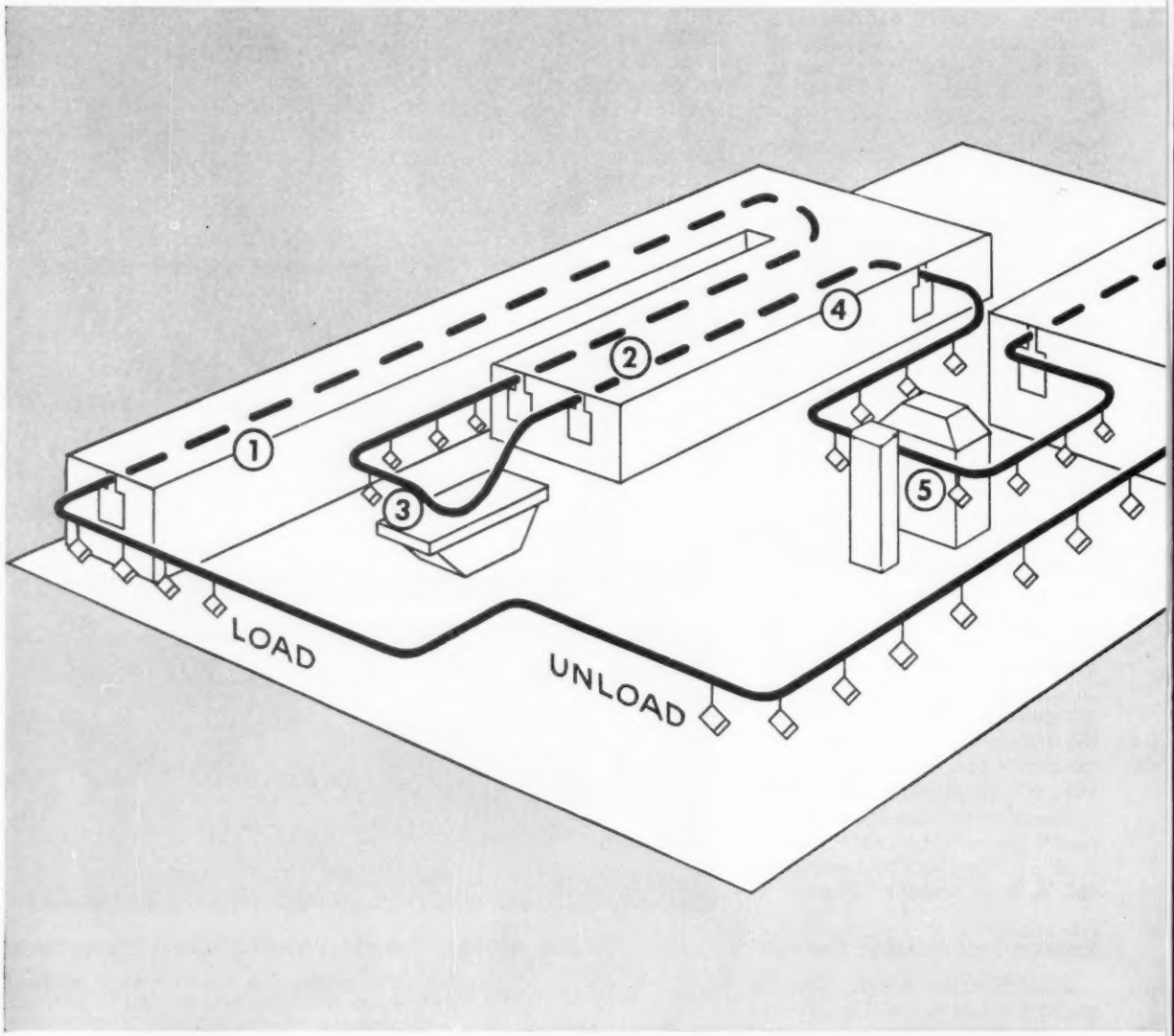
"Universal" manipulators, designed and manufactured by a weldment fabricator, are the only *fully portable and adjustable* machines of their type. They can be set-up quickly wherever crane facilities permit . . . position any automatic head rapidly . . . pilot heads at proper welding speeds . . . operate with machine tool accuracy.

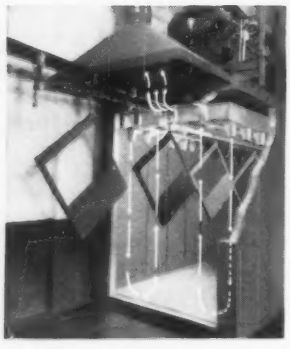
That's why LEWIS "Universals", track or pedestal types, assure greater cost savings and profits in automatic welding jobs.

For Details and Prices, Write for Bulletin 6960.

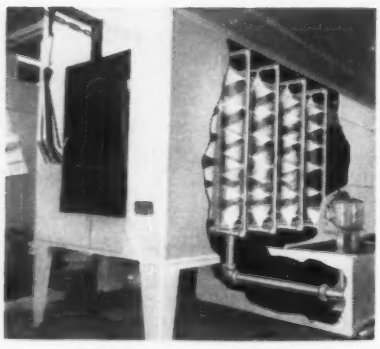
LEWIS
THE LEWIS WELDING & ENGINEERING CORP.
WELDING DIVISION
7494-LWE 103 NORTHFIELD ROAD BEDFORD, OHIO
SPECIALISTS IN WELDMENT FABRICATION AND PRECISION WELDING EQUIPMENT

DeVilbiss announces a New and





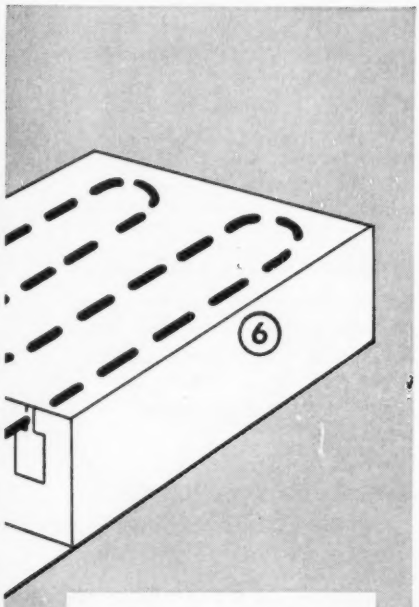
NEW! Industrial Ovens



NEW! Parts Washers

NEW! Multi-Stage Metal-Treating Units

expanded line of finishing equipment



DeVilbiss' experience in the design, manufacture, and installation of systems like this, means you save in cost and operation; benefit in performance and product quality.

1. Phosphatizing Unit
2. Dry-off Oven
3. Dip Tank
4. Prime Coat Bake Oven
5. Automatic Spray Machine
6. Finish Coat Bake Oven

Now, through its new subsidiary—Newcomb-Detroit Company—DeVilbiss emerges as the only "one-source" company that designs, manufactures and installs complete painting systems for all major types of finishing operations.

WHATEVER you manufacture—giant aircraft or miniature lamp filaments—now you can get *all* your coating and finishing equipment from a single company . . . DeVilbiss!

Supplementing its complete line of spray equipment, DeVilbiss now offers industrial ovens; flo-coaters and dip-coaters; automatic washers for parts cleaning, metal treating, and spray pickling; dust collectors for grinding, polishing, and metal-finishing operations; and complete systems, custom-designed or built-up from standardized components.

These facilities offer important advantages to you: one-source responsibility for product quality, performance, operational efficiency; matched equipment for fully integrated systems; and individual finishing units backed by diversified design and manufacturing experience.

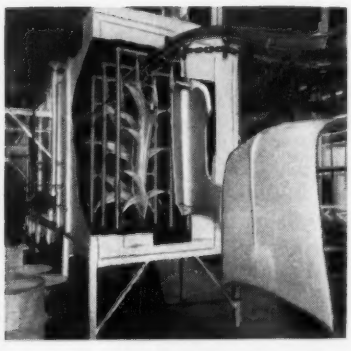
Engineering, installation and service facilities are available from coast to coast. So when planning to build, expand or remodel your finishing system—or replace any component in your present operation —call in DeVilbiss.

FOR BETTER SERVICE, BUY

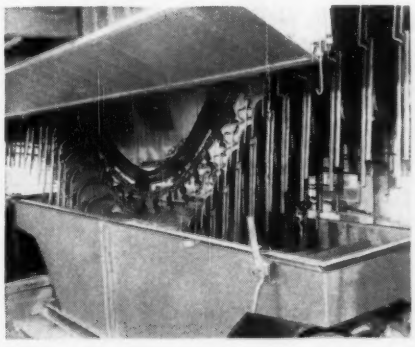
DEVILBISS

THE DEVILBISS COMPANY, TOLEDO 1, OHIO

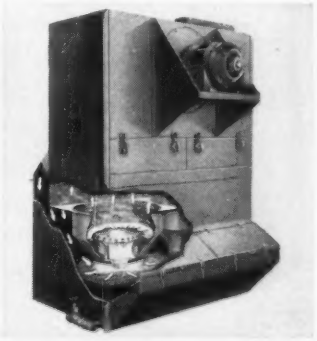
Barrie, Ontario • London, England • Branch Offices in Principal Cities



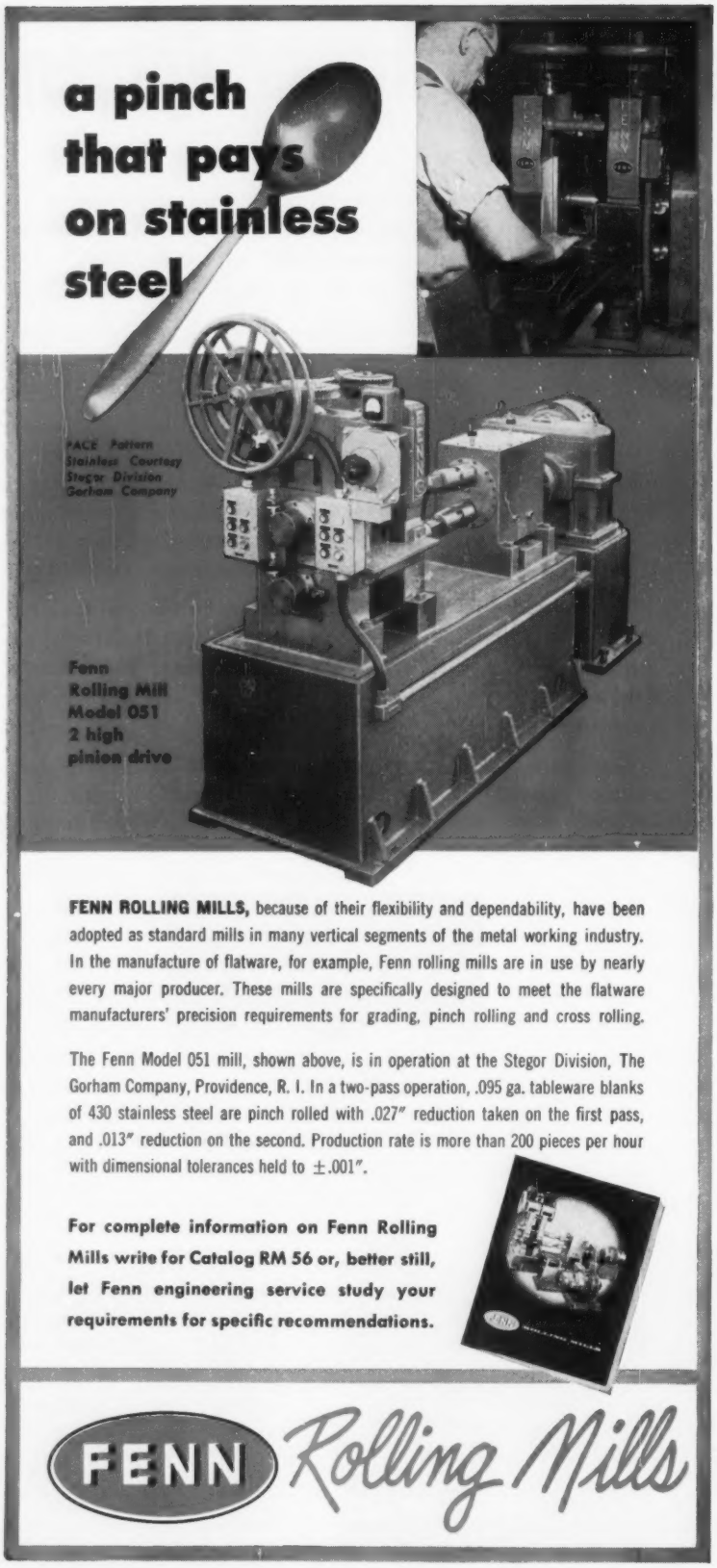
NEW! **Flo-Coaters**



NEW! **Dip-Coaters**



NEW! **Dust Collectors**


a pinch that pays on stainless steel
PACE Pattern Stainless Courtesy Stegor Division Gorham Company
Fenn Rolling Mill Model 051 2 high pinion drive
FENN ROLLING MILLS, because of their flexibility and dependability, have been adopted as standard mills in many vertical segments of the metal working industry. In the manufacture of flatware, for example, Fenn rolling mills are in use by nearly every major producer. These mills are specifically designed to meet the flatware manufacturers' precision requirements for grading, pinch rolling and cross rolling.
The Fenn Model 051 mill, shown above, is in operation at the Stegor Division, The Gorham Company, Providence, R. I. In a two-pass operation, .095 ga. tableware blanks of 430 stainless steel are pinch rolled with .027" reduction taken on the first pass, and .013" reduction on the second. Production rate is more than 200 pieces per hour with dimensional tolerances held to ±.001".
For complete information on Fenn Rolling Mills write for Catalog RM 56 or, better still, let Fenn engineering service study your requirements for specific recommendations.
FENN Rolling Mills
THE FENN MANUFACTURING COMPANY 404 FENN ROAD, NEWINGTON, CONNECTICUT

(*Concluded from Page* 115

purchasing, Ray St. John; secretary-treasurer, S. L. Greenberger.

Installs Vacuum Furnace

Hollywood Heat Treating Co., Los Angeles, installed what is said to be one of the largest vacuum heat treating furnaces available to private industry. It is 99 in. in diameter by 10 ft deep and will accommodate a retort with an effective working zone of 55½ in. by 9 ft. It will reach about 2200° F with a vacuum of 0.1 micron.

Bethlehem To Erect Building

Bethlehem Steel Co., Bethlehem, Pa., will erect a multimillion dollar building for a new printery and account unit on a 53-acre tract on Eighth Avenue near Eaton Street. that city.

Bucyrus-Erie Buys Furnace

Bucyrus-Erie Co., South Milwaukee, Wis., awarded a contract to Gas Machinery Co., Industrial Furnace Div., Cleveland, to install four gas fired, box type heat treat furnaces at its plant in Erie, Pa.

Ohio Knife Enlarges Facilities

Ohio Knife Co., Cincinnati, installed a heat-treating furnace which can harden products up to 240 in. long in one operation. The firm operates more than 20 furnaces.

NEW PLANTS

Ampco Metal Inc., Milwaukee, producer of aluminum bronzes and products of this alloy, will build a $200,000 branch foundry at Garland, Tex. Expected to be in operation by March, 1958, it will include sand and centrifugal foundries, heat treating facilities, and some machining operations.

Air Filter Corp., Milwaukee, is constructing a 25,000 sq-ft plant which will double plant capacity.

G & H Products Corp. is building a $300,000 plant at Kenosha, Wis. Production is scheduled to

MACHINING PERFECTION always starts with the right steel

Pick exactly the right steel for any job from J & L's complete cold finished line

"Manufacturer saves three ways with J & L 1113 Bessemer steel"

This friction shaft part for a textile machine was converted to J&L "1113" Bessemer steel with these results:

- Time cycle reduced 20%
- Surface finish improved 20%
- Tool life increased 100%

Due to these savings, manufacturer is now using J&L "1113" steels for other applications. You can get similar savings in cutting speeds and tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL **Jones & Laughlin** ... a great name in steel

Ask Standard

how to cut costs with conveyors

Standard limit-switch-controlled Automatic Reciprocator is one of two used to form 200-ft. overhead detour of dehumidifier assembly line.

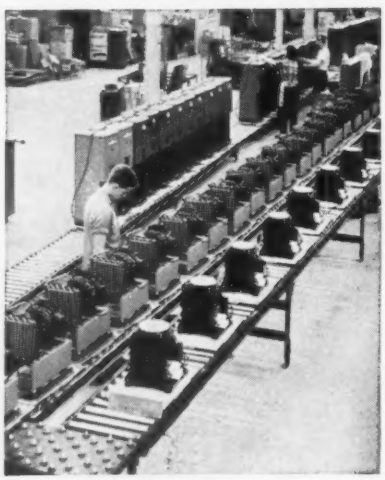
"COMPLETE CONVEYORIZING" . . . what it did in a smaller plant

Products at Ebco stay on conveyors until packaged and sent to shipping.

Ebco Manufacturing Company — employing 275 people to produce water coolers, beverage dispensers and dehumidifiers — has realized substantial savings by completely conveyorizing their operations. Ebco engineers planned for an orderly conveyor system when developing plant layout and building design; consequently conveyor system costs were kept "low" and resulting efficiency is "excellent."

Similarly, it will pay you to take another close look at your present conveyor system. Standard specialists will be pleased to help you make evaluations . . . recommend the proper equipment and its application to meet your specific needs.

STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Gravity roller conveyors like this, used for Ebco's assembly lines, are inexpensive, easy to set up, and economical to maintain.

For details on Standard Conveyors of all types, contact the Standard representative listed in your classified phone book or write direct. Ask for Bulletin Y-9.

start about Nov. 1. The firm makes stainless steel fittings for the dairy, food, and chemical industries.

Paragon Electric Co. will build a $400,000 plant at Two Rivers, Ont. The building will replace five plants and warehouses in that city and will nearly double the firm's present space.

NEW OFFICES

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., opened a branch sales office at 438 Olive St., San Diego, Calif. J. T. Wavra is branch manager.

Midcontinent Tube Service Inc., distributors of carbon and alloy steel pipe, tubing, valves, and fittings, will occupy newly acquired property at 2120 Lee St., Evanston, Ill., on or about Oct. 1.

Allmetal Screw Products Co. Inc., Garden City, N. Y., opened headquarters for its Midwest Division at 5611 W. Lake St., Chicago 44, Ill. The operation will be headed by Tom Schaid. The firm makes stainless steel fasteners.

ASSOCIATIONS

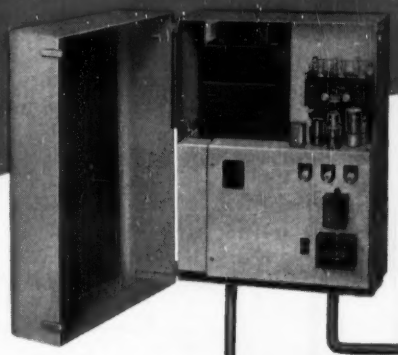
Environmental Equipment Institute, Princeton, N. J., elected these officers: President, E. S. Brown, Standard Cabinet Co., Carlstadt, N. J.; executive vice president, R. J. Jacobson, Cincinnati Sub-Zero Products, Cincinnati. Dr. G. D. Wilkinson is general manager.

Institute of Environmental Engineers, Princeton, N. J., elected these officers: President, H. F. Sander, Vapor Heating Corp., Chicago; and executive vice president, R. J. Amorosi, Parameters Inc., Garden City Park, N. Y.

Don A. Leahy, Allison Steel Mfg. Co., Phoenix, Ariz., was elected president of the Phoenix Control of the **Controllers Institute of America**, New York. H. M. Snook, Tennessee Coal & Iron Div., U. S.

DYNAMATIC®

Drive Package Provides Infinitely Adjustable Speeds from AC Power Source



CONTROL PANEL

CONTROL STATION

The complete Dynamatic power package includes all components required to provide infinitely adjustable speeds from an alternating current power source. A Dynamatic Ajusto-Spede® or Dynaspede® Drive, with electronic control and pushbutton station, satisfies the requirements of almost any application where proper machine operation or material processing depends upon control of operating speeds.

The compact control panel may be remotely mounted to conserve valuable space on the driven machine. The pushbutton station at the operator's position puts vital controls conveniently at the operator's fingertips and requires a minimum of space.

Speeds are infinitely adjustable from 0 RPM to full output speed, and accurate speed regulation may be obtained from 100 RPM to full output speed.

Ajusto-Spede® Drives, available in ratings of ¼ horsepower to 75 horsepower, are air-cooled. Dynaspede® Drives, rated from 3 to 75 horsepower, are liquid-cooled. Raise your productive efficiency with Dynamatic eddy-current units.

DYNAMATIC®
AJUSTO-SPEDE DRIVE

Send for Illustrated Literature Describing Dynamatic Adjustable Speed Drives

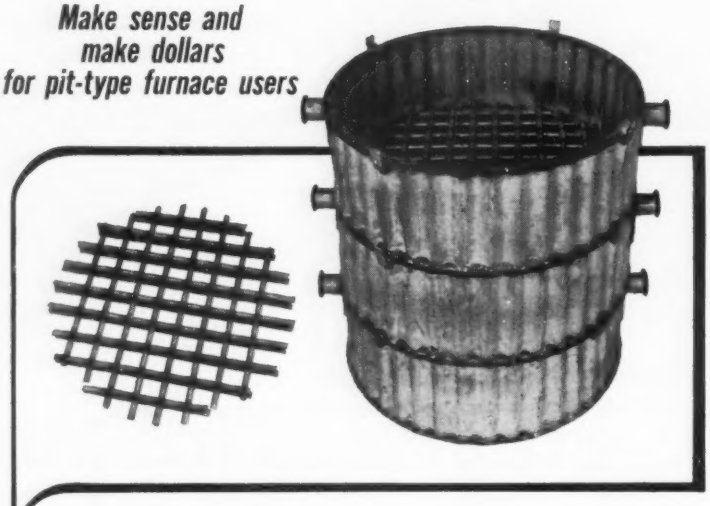
EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

ROLOCK
FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT

Make sense and make dollars for pit-type furnace users



ROLOCK'S unique CORRUGATED construction

with pressure-welded truss-type grids

There are many good reasons why these new furnace baskets out-perform and outlast older types. ROLOCK's Corrugated Construction gives high strength with light weight and this, in turn, means less material to bring up to temperature with faster, more uniform heat transfer . . . and a higher ratio of pay load to basket weight. Such baskets mean a substantial saving in furnace time because of faster recovery and, in some cases, an increase in average load as well.

ROLOCK's specialized Welded Fabrication takes full advantage of this construction in every respect. The grid, for example, is built up from rounds rather than flats by a ROLOCK-developed pressure-welding method. Experience shows that such grids are far better able to withstand thermal shock. They may be reversed as required, to compensate for deflection, without cracking.

In this field, as in many other specialized applications of welded-fabricated heat-resistant alloys, ROLOCK's exceptional facilities and skills often promise major operating savings. Write us outlining your problems.

SALES & SERVICE FROM COAST TO COAST

ROLOCK INC., 1262 KINGS HIGHWAY, FAIRFIELD, CONNECTICUT

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

6RL57

Steel Corp., Fairfield, Ala., was similarly honored by members of the Birmingham Control.

NEW ADDRESSES

General Machinery Supply Co. moved to a new $150,000 office and warehouse building at 1680 14th St., Oakland, Calif. The firm distributes tools, threaded fasteners, and contracting supplies, including plumbing and electrical.

DeVilbiss Co., Toledo, Ohio, moved its direct factory branch in Atlanta to 1100 Northside Drive N.W. Roy Steele is divisional sales manager.

CONSOLIDATIONS

American Commercial Barge Line Co., Jeffersonville, Ind., has been formed through merger of **American Barge Line Co.** and **Commercial Transport Corp.** It will operate on a river system covering an area extending from the Great Lakes to Mexico.

Parks Electronics Corp., Redwood City, Calif., purchased **Henry Francis Parks Laboratory**, Portland, Oreg., and Redwood City. A 6300 sq-ft plant has been leased for five years and has been equipped with research and production facilities.

Texas Eastern Transmission Corp., Shreveport, La., acquired **La Gloria Oil & Gas Co.**, operator of an oil refinery at Tyler, Tex., and a natural gas processing plant at Falfurrias, Tex.

Chas. Pfizer & Co. Inc., New York, acquired **Morton - Withers Chemical Co.**, Greensboro, N. C., producer of chemical specialties for the petroleum, rubber, and plastics industries.

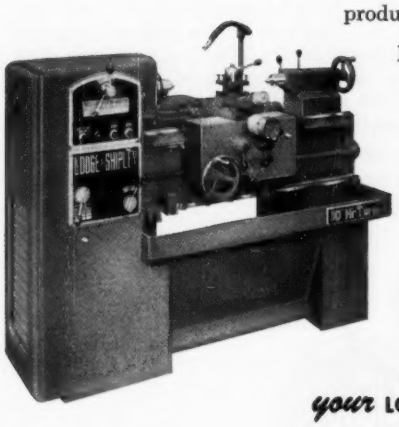
Vulcan Materials Co., Birmingham, has acquired **Union Chemical & Materials Co.**, Pittsburgh, subject to stockholders' approval. Vulcan also acquired **Lambert Bros.**, Knoxville, Tenn.; **Ralph E. Mills**

(*Please turn to Page* 126)

Quick as a...

on a lathe
specifically designed
for production
with accuracy and economy

High speed turning, boring and facing are child's play . . . with the Lodge & Shipley HI-TURN Lathe. Whether on single or multiple-piece work, this 10″ Production Lathe provides productive capacity at a price substantially below conventional lathes.



Designed for fast, convenient operation, it eliminates rarely used features, incorporates many standard features never before found at any cost in a lathe of this size.

The 10″ HI-TURN gives you horsepower, rigidity and production you would normally expect to find in lathes costing twice as much. We can prove more production per lathe dollar . . . more production per operator hour!

Find out how the HI-TURN Lathe fits your turning requirements.

WRITE: LODGE & SHIPLEY, 3055 COLERAIN AVE., CINCINNATI 25, OHIO

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REDESIGNED HEADSTOCK is massive, rigid casting, eliminating vibration and assuring maximum accuracy. Electric combination clutch and brake permits fast, smooth starts and stops without overheating. The Gisholt main control (manually or hydraulically operated) and the simple push buttons and feed-stop valves speed changeovers. A wide range of spindle speeds permits peak machining efficiency on all materials.

GISHOLT JETracer (mounted in place of standard front carriage) for either single or multiple pass work. For latter, JETracer will make up to four consecutive, automatic passes from four templates of different lengths and patterns. **Standard rear independent slide** can operate any time within the general machine cycle to complete the part. **Air- or hydraulically-operated tailstock** can be easily mounted, positioned or removed.

High capacity + flexibility = economy

ISN'T THIS WHAT YOU WANT

CONSIDER WHAT YOU CAN DO with this new Gisholt MASTERLINE No. 12 Automatic Production Lathe:

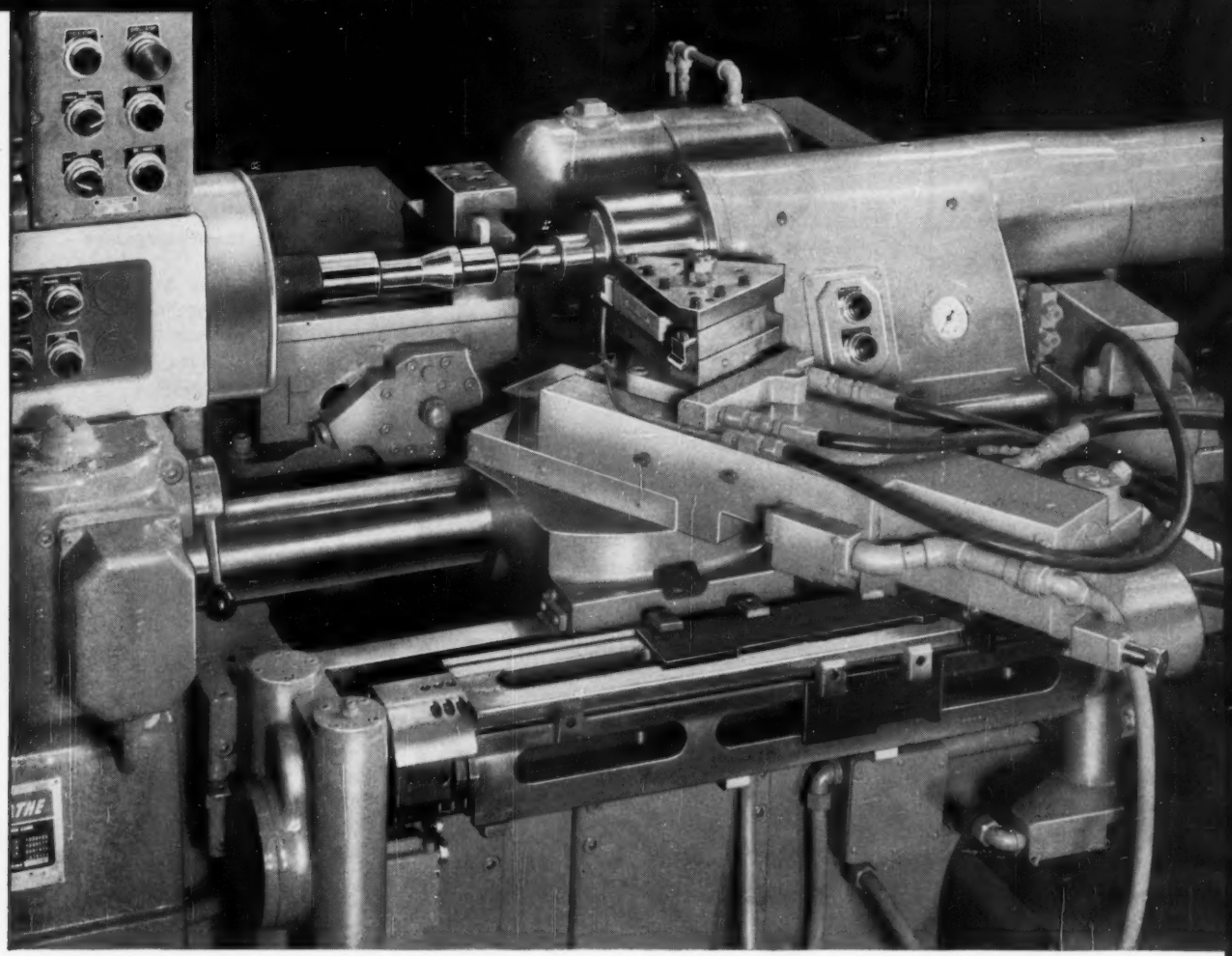
Here is an automatic lathe designed specifically for high production operations—yet this machine is flexible enough to handle a variety of similar parts in small repeat lots.

You can hold work in a chuck or fixture—with a work driver and tailstock—on an arbor or between centers. To start the automatic cycle, your operator simply loads the part, chucks it and raises the Main Control Lever. He is then free to handle additional machines—or to perform other work—until the part is completed.

On the Gisholt No. 12 Automatic, all carriage and slide movements are hydraulically actuated. The front carriage has both longitudinal and transverse motion—or a combination of the two—with quick approach, automatic tool relief and rapid return. You can mount the rear independent slide at any angle to machine bevel gears, drill cones, or handle other parts with angular surfaces.

For special jobs—like machining both ends simultaneously on small motor frames, cylinder sleeves,

MASTERLINE GISHOLT SINCE 1887 GISHOLT



IN AN AUTOMATIC LATHE?

or similar parts— you get even greater flexibility from the No. 12 through auxiliary slides, operated by movement of the standard slides. Or you can mount a back facing attachment within the spindle—for still another way to machine a maximum number of surfaces in one chucking. And for outstanding versatility with great savings in tool and setup costs, the front carriage on the No. 12 may be replaced by a single- or four-pass JETracer slide.

For complete details of the new features on the Gisholt MASTERLINE No. 12 Automatic Production Lathe, call your Gisholt Representative.

WRITE GISHOLT TODAY for advance data on the new Gisholt MASTERLINE No. 12 Automatic Production Lathe. Ask for Form 1178.

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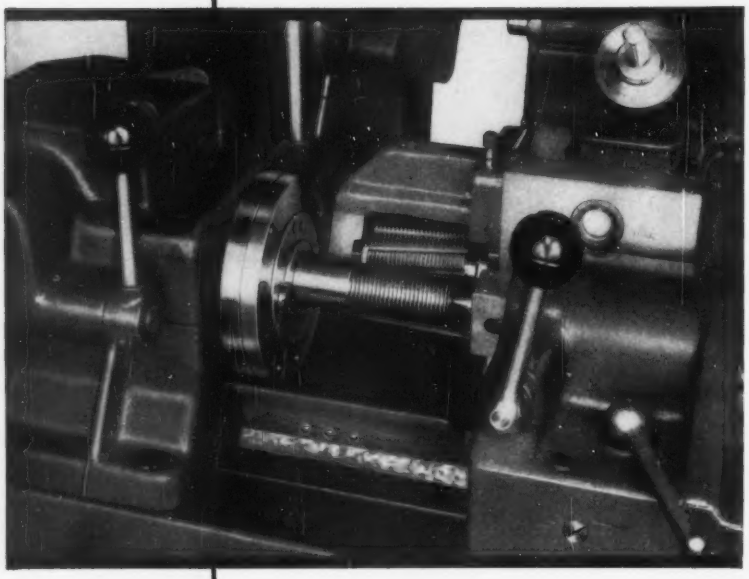
Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

ONE
GOOD TURN



Hanson-Whitney Thread Milling Machines produce precision threads with *one turn* of the work. Featuring precision cutting of internal or external, straight or taper, left or right hand threads, H-W's great versatility boosts your production profit.

The Hanson-Whitney Thread Milling Machine features an exclusive cam design eliminating back lash, and providing a full automatic cycle for lead and depth plus rapid retraction, which speeds gaging and loading.

Hanson-Whitney's *single source* production integrity covers their complete line of machine and cutting tools, fixtures and precision gages. Consult H-W's complete home and field engineering service on all threading problems.

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TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

(*Concluded from page* 122)

Co., Frankfort, Ky.; **Brooks Sand & Gravel Co.**, Kingsport, Tenn.; **Wesco Paving Co.**, Chattanooga, Tenn.; and several other firms affiliated with these companies.

Federal Machine & Welder Co., Warren, Ohio, purchased controlling interest in **Berkely-Davis Inc.**, Danville, Ill., builder of automatic arc welding equipment.

Ling Electronics Inc., Los Angeles, acquired **American Microwave Corp.**, North Hollywood, Calif. Fred W. Bailey will continue to direct operations of this new subsidiary.

REPRESENTATIVES

Vulcan Crucible Steel Div., H. K. Porter Company Inc., Aliquippa, Pa., appointed Harbor Steel & Supply Corp., Muskegon, Mich., as a distributor for its tool steel products.

Calumet & Hecla Inc.'s Wolverine Tube Div., Detroit, appointed G. F. Wallace as its sales representative in the northern Texas and Oklahoma area. His headquarters will be in Dallas. The division also appointed Robert Allan as sales representative in Grand Rapids, Mich.

R. N. Kendall, vice president of **Colonial Broach & Machine Co.**, Detroit, is moving to Milwaukee to take direct charge of the area. The firm appointed these representatives of its Colonial-Romulus Div.: E. W. Brock Co., Cincinnati; Eaton Co., Hackensack, N. J.; and Geoffrey-Lane Inc., Denver.

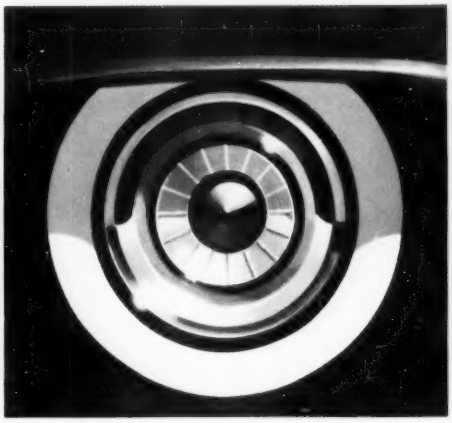
Wilson Petrolcoke & Carbon Corp., New York, has been appointed sales representative for the new metallurgical coke produced by the Colorado refinery of **American Gilsonite Co.**, Salt Lake City, Utah. The company will handle all foreign and domestic sales to electrode, carbide, and steel manufacturers, and to the aluminum industry abroad. Coke sales to the aluminum industry in the U. S. and Canada will be handled directly by American Gilsonite Co.

On CARS, too... "handsome is as handsome does"...

here's how beautiful Stainless Steel does a car-saving job for you

stainless moulding protects body paint from rubs and scrapes

stainless trim makes weatherproofing permanently attractive



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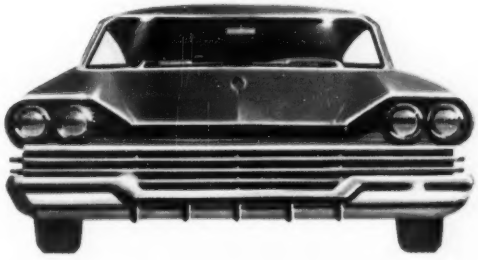
stainless provides solid protection for easily-marred decorative panels

and... stainless brightens the entire car for life!

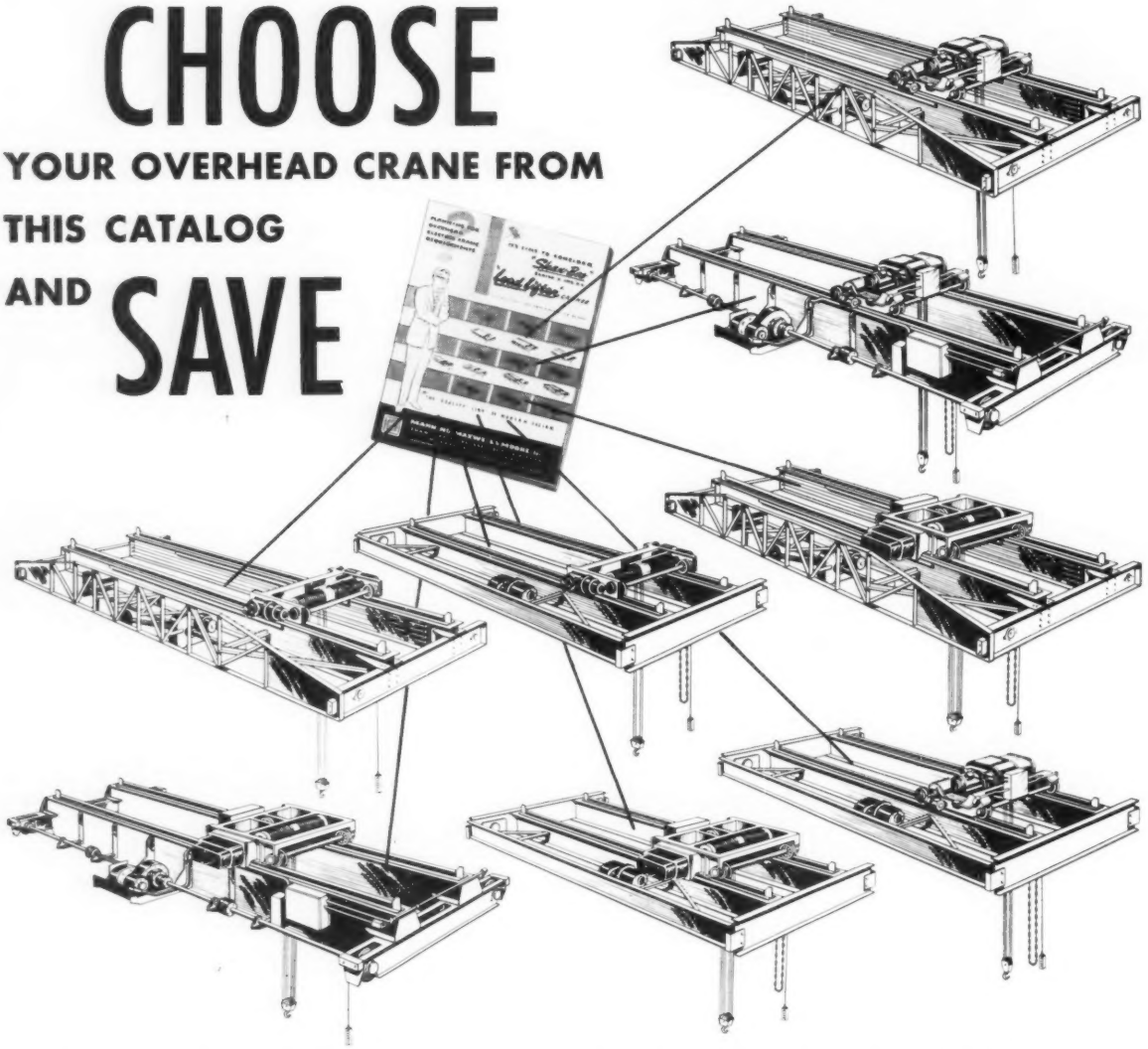


Superior Stainless Strip Steel

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

CHOOSE

YOUR OVERHEAD CRANE FROM THIS CATALOG AND SAVE



Now you can have a crane up to 20 tons capacity without getting into extensive engineering. Series "D" 'Load Lifter' Electric Traveling Cranes are so highly standardized you can select from this catalog. You save time and worry and pay less for the crane you want.

Mass production methods are used to build these cranes in capacities from 1 to 20 tons, with spans to 80 feet and with floor or cage control. Even though other cranes for average industrial service cost substantially more, Series "D" Cranes have features found only on the most expensive cranes. Modern construction techniques and components eliminate needless dead weight and drag. An I-beam double girder bridge is provided for spans up to 40 feet. Box-section welded girders give extra rigidity to spans over 40 feet. No whipping or skewing. Other plus values include: maximum use of anti-friction bearings; ball-bearing equipped rotating axles for bridge and trolley wheels; gearing that operates in oil; a double braking system; positive magnetic control; servicing convenience that saves time and money year after year.

The through-and through quality of Series "D" 'Load Lifter' Electric Traveling Cranes combines high performance and low power consumption with complete safety for man, load and crane. Save on initial cost and get the benefit of efficient, economical load handling. Get a catalog and choose a Series "D" 'Load Lifter' Crane in the size, type, trolley style and span you require. *Ask for Catalog 221.*

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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

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Technical Outlook

UPS MACHINABILITY— Between 0.20 and 0.25 per cent copper in cold finished steel bars increases machinability by about 10 per cent, says LaSalle Steel Co., Hammond, Ind. Tests of the material, called Stressproof with copper, show improvements in tool life (some last 2½ times longer than those used on bars without the copper); increased resistance to corrosion; better wearability and elasticity; and reduced brittleness. Sulfide additives, silicon, furnace treatment, and an unusually great mill reduction (heavy drafting) are also responsible for improvements. A patented die controls deformation forces, reducing warping and cracking.

BIGGER TRANSISTOR— General Electric has unveiled its new 85-watt transistor, one of the highest powered available. A silicon device, it operates on 65 volts, is expected to find applications in direct current to direct current and alternating to direct current converters; in servoamplifiers for autopilots and engine controls; in power supplies as series regulators; and in replacement of mechanical contactors and switches.

SQUARE IRON— General Electric Research has developed an improved sheet material for transformers, motors, and generators. Called four-square silicon iron, it is easily magnetized in four directions. Expected benefits: Lower energy losses and fewer noises in electrical equipment.

GOLD FACE IT— A dip is sufficient to coat many metals with 24-carat gold, say the developers of a process called Atomex. It's said to have these advantages over electroplating: Greater density achieves same appearance with 35 per cent less gold; all parts (even blind recesses) receive coatings which are equally thick; gold interlocks with base metal; bath control is unnecessary; and spent solution can be thrown away since all the gold in it can be used up.

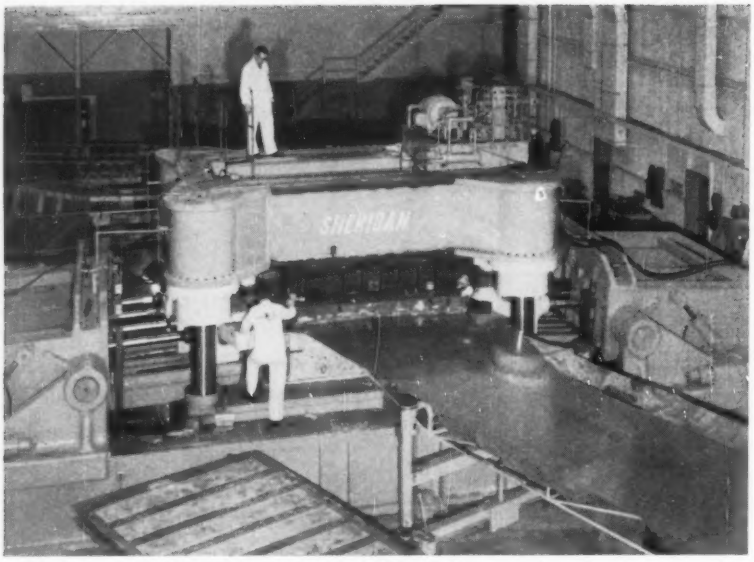
CUT-RATE RADIOACTIVITY— Industry now can get Cobalt 60 for 50 to 70 per cent less, says Nuclear Systems, division of Budd Co., Philadelphia. Its principal value is in thickness gaging, radiography, and research. The announcement affects all sources up to 50,000 curies.

TITANIUM CASTING PREVIEW— Recent Air Force research puts the finger on molybdenum aluminide (Mo_3Al) as a promising material for a better refractory mold for titanium. Although wet by titanium during melting, the report says, only 3 per cent of the molybdenum and aluminum is taken into the melt. Time and temperature must be held to a minimum.

OXYGEN GROWS— The top blown oxygen converter, which got its start in Linz, Austria, only a few years ago, has already spread to 15 plants in nine countries. (Probably more.) Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif., which holds U. S. licensing rights, says the official name is now the "L-D Process," which a lot of people have been calling it anyway. Kaiser's estimate for world-wide L-D production in 1958: 7 million U. S. ingot tons.

DIAMONDS IDENTIFIED— A uniform national code for diamond wheel shapes is available, says the American Standards Association, New York. The code can be easily applied to practically all shapes. A similar project for the dimensions of diamond abrasive wheels is underway.

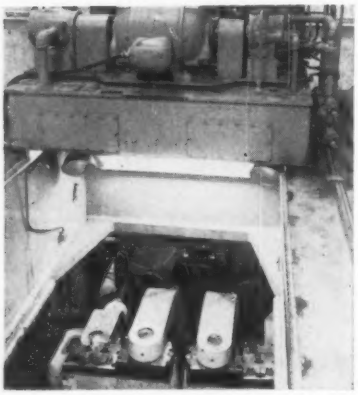
Metalworking Outlook—p. 81 *Market Outlook—p. 181*



Preshaped aluminum sheet, 50 ft long, overhangs the press. Contour is formed only at the root end. Jaws grip sheet sides to hold for stretching

Press Stretches Jet Parts

Said to be the world's largest, this stretch press puts a contour in the root of wing panels for Douglas' DC-8 jet airliner. Part weight is about 1200 lb



View down into top of press shows huge gripping jaws

TAKE a partially folded piece of paper and try to figure out how to get the folded edge to take on a broad curvature. That's the problem that faced engineers at Douglas Aircraft Co. Inc., Long Beach, Calif.

The part is a wing panel for the company's new DC-8 jet airliner. Panels are made from tapered aluminum sheets which are 50 ft long and 10 ft wide at the root. The sheet is nearly ¼ in. thick at its heaviest section.

Here's How—Sheets are rough trimmed and bent, then go to a specially built Sheridan stretch forming machine. In the press, the bend is centered over a form-die ram. Clamping jaws grip the sides of the sheet with a force of 1200 tons.

Four hydraulic cylinders, each with a pulling capacity of 150 tons, pull on both sides of the sheet. A single cylinder rated at 456 tons lifts the die table (ram) into the sheet, forcing the stretched section to take on the required contour.

A holding fixture beside the machine supports the some 35 ft of length not formed in the press.

The Press—At a recent Vickers hydraulic conference, Carl Blanchard, chief engineer for the press builder (Sheridan-Gray Inc., Torrance, Calif.) described the all-hydraulic power system. Pressures range from 2000 psi in the tension cylinders and die table to 7500 psi in the jaw gripping cylinders.

"Each tension cylinder," Mr. Blanchard says, "is positioned by its own closed loop servosystem. It consists of a potentiometer and an electronic amplifier. The error signal goes to an electrohydraulic servovalve which ports to the cylinders directly."

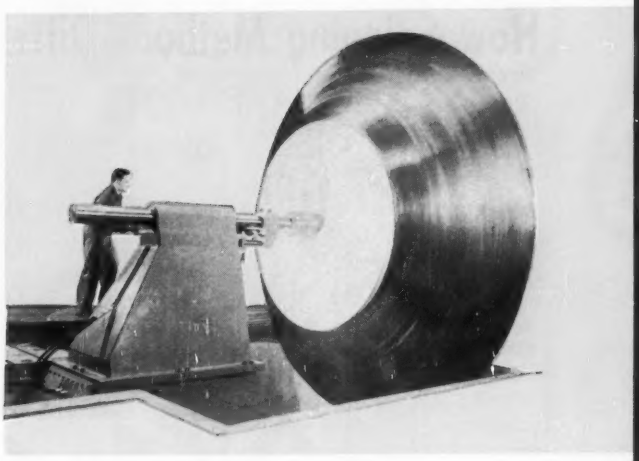
The feed back loop uses a second potentiometer with its shaft positioned through a mechanical cable connection by the jaw. This closed-loop system positions the jaws within $\pm 1/64$ in.

Leveler — An upper clamping power unit, mounted on the structure, supplies fluid to all four vertical cylinders simultaneously. Since there are no exterior guide posts or gibs, the piston rods must serve that purpose. Fluid flow, then, must be divided equally between the four cylinders to prevent cocking or binding on the piston rods.

Flow from the central pumping source goes through four fluid motors whose output shafts are connected. The motors are bypassed at the end of the up stroke on each cycle, and the cylinders are "bottomed out." This allows for slight differences in motor slip rates and serves to relevel the structure. Pressure used in this system is 500 psi until the part is clamped. It then is boosted to 5000 psi.

Problems—The major problem, according to Mr. Blanchard, was one of leak prevention. All pressure lines are welded. Special piloted flanges are used at all cylinder ports. Tubing is flared and stainless steel fittings are welded to special manifold blocks.

Since aircraft type servovalves are in the system, cleanliness is critical. Sheridan engineers incorporated filters, rated at 4 to 5 microns, at the main pump.



production ideas

Spinning Keeps Pace with New Technology

One of the simpler production techniques, it's still the best way to form many parts. New developments, notably automatic methods, have piled up added advantages

METAL SPINNING has been described as a low cost, low and medium volume, high quality production technique. In this era of high competition, it is worth a second look.

The principles of spinning are centuries old, but the ways it is being used are new. Typical spun parts: Conical, spherical, and cylindrical shapes for jet aircraft and missiles; electric motor shrouds and covers; food processing equipment; fan and blower parts.

Spinning Defined—Essentially, it is the pressure forming of metal—on a rotating chuck or die. The part must be concentric.

Originally, all spinning was done with hand held forming tools; the material that could be spun was limited to the highly ductile metals, such as copper and aluminum. The new technology demands less ductile metals like the stainless steels; new spinning techniques will handle them.

Some metals are spun hot to increase their plastic flow. Usually, a torch is mounted on the spinning lathe and directed on the metal. Many alloys, such as some stainless alloys, titanium, and magnesium, must be spun hot to make them ductile enough to work. Heavy sections of easier-to-spin metals usually are spun hot so they can be handled better.

When higher forming pressures than can be obtained manually are needed, a hydraulic ram or mechanical means are used. This method often is used for flanged and dished heads, covers, and similar pieces when quantities are large enough to warrant higher setup costs. It also is used for cold forming of large diameter, heavy sections where hot spinning would be impractical.

New Developments—Power spinning on such machines as the Hydrospin (made by Cincinnati Milling Machine Co., Cincinnati), and the Floturn (made by Lodge & Shipley Co., Cincinnati), differs from how it's done with other methods. The automatic machines form ductile metals into conical, spherical, curvilinear, and cylindrical shapes by displacing metal under high pressure.

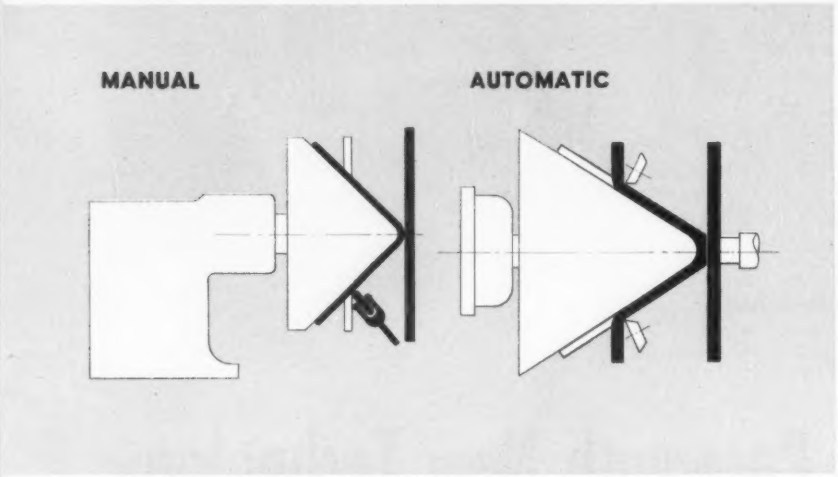
A third machine (Spin-Forge, made by Hufford Corp., El Segundo, Calif.) combines the features of a vertical spinning lathe and power spinning. Opposed rollers are fed down a form hydraulically, forcing the metal to conform to a die. Roller travel in all directions is controlled by a tracer which follows templates. A closed TV circuit provides a close-up view from a remote operating location. It protects an operator in case of part failure.

Application—A rocket part being spun by Commercial Shearing & Stamping Co., Youngstown, starts as a circular blank 18 in. in diameter and 1 in. thick. The material is 1020 carbon steel. Commercial preforms the part on its heavy stamping presses before spinning on a Hydrospin machine.

The spun part is a truncated cone about 12 in. long. Large end diameter is 11⅞ in.; small end diameter is slightly under 5⅝ in. The wall thickness tapers toward the large diameter. Finish machining on the part includes threading the small end, drilling two holes, and tapping one of them. Originally, the part was made as a forging and required considerable ma-

How Spinning Methods Differ

In both manual and automatic spinning, the workpiece is forced to take the shape of a rotating chuck or mandrel.



MANUAL METHOD, the metal is formed over the hardwood or steel chuck, with a hand-held tool that may or may not have a metal, fiber, or plastic roller on the end. To form some of the less ductile metals, hydraulic powered or mechanical forming tools may be used. There is little or no thinning out of the metal during forming; blank diameter must be large enough to make up for the depth of the finished part.

AUTOMATIC SPINNING, the workpiece is squeezed against the hardened steel mandrel by one or two hardened steel rollers and stretched as the rollers travel along the mandrel's length. The metal undergoes shear deformation, resulting in elongated grain structure. Blank diameter usually is the same as finish diameter; material for the depth of the part is obtained from the blank thickness.

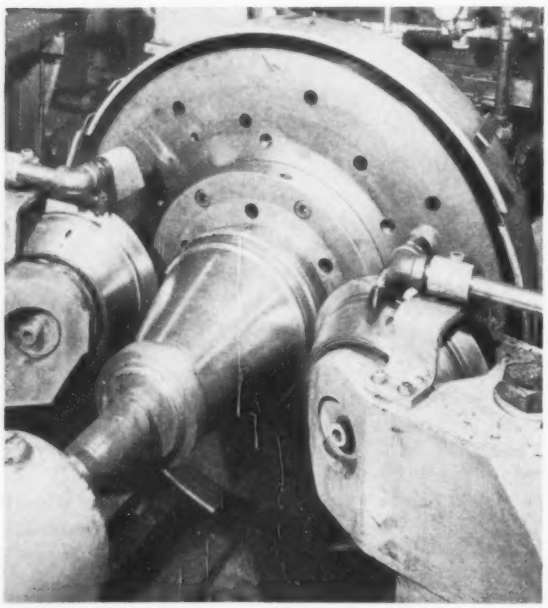
chining. Spinning costs less.

Each Has Its Place—Although power spinning is the newest phase of this production method, manual methods account for the greatest volume of parts. It is still the economical way to form many parts.

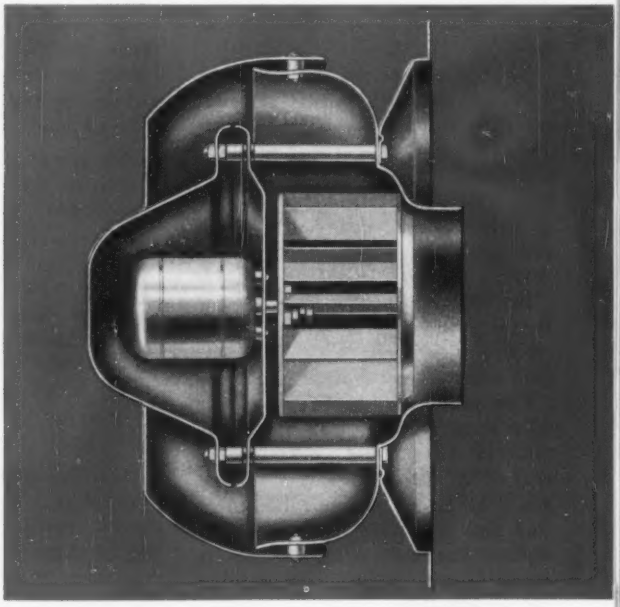
Spinning chuck costs are only a fraction of die costs used in press forming. For the soft metals, hard wood chucks can be used. Most spinners prefer steel chucks for the harder metals. With the pressures that are necessary, it's difficult to hold tolerances on wood chucks. Roland Teiner Co., Everett, Mass., is spinning small diameter aircraft parts to plus or minus 0.005 in. and large diameter parts to plus or minus 0.010 in.

Leadtime is shorter on spun parts because tooling can be made in days or hours. Often, product design can be improved because spun parts are usually seamless, and cold working improves the strength of the metal. Stiffening flanges, beads, or internal grooves can be added.

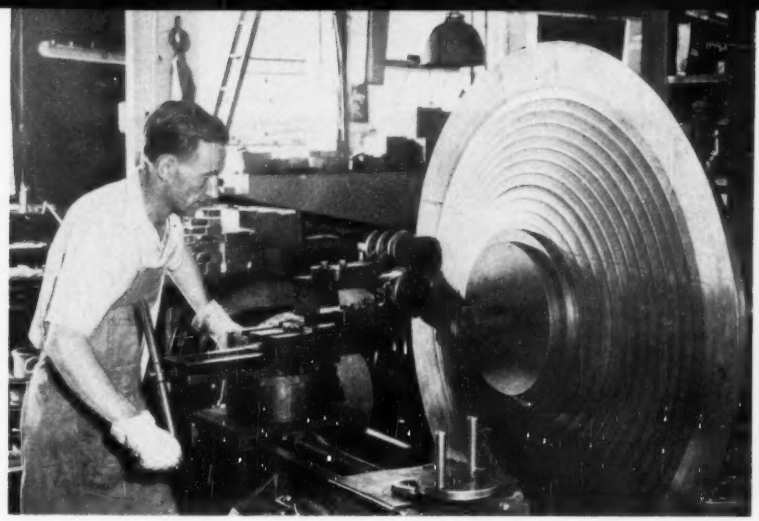
Example—Spencer Turbine Co., Hartford, Conn., spins the head end for its line of low pressure, centrifugal compressors. The concentric grooves that are spun into the mild steel dished heads for greater rigidity have become a trademark for the company.



This rocket part (1020 steel) is spun at Commercial Shearing & Stamping Co. from a stamped preform



Wall ventilator built by Loren Cook Co. is made up of five aluminum spinnings



Head end of a low pressure, centrifugal compressor (mild steel) is spun at Spencer Turbine Co. Spun-in concentric grooves add rigidity

$381.25 per unit. (This includes amortized die and material costs.) The first five spun shells would cost $54.65 per unit. (This also includes amortized die and material costs.)

At 1000 pieces, the deep drawn shell drops to $3.21 unit cost. The spun shell at that quantity would have a $5.15 unit cost. The break-even point is about 600 pieces.

Spinning is nearly always more economical on cone shapes. A deep drawn stainless steel cone would have a unit cost of $1522.50 for the first five pieces. A spun stainless cone would cost $78.17 per unit for the first five pieces. At 5000 pieces, the unit cost of the

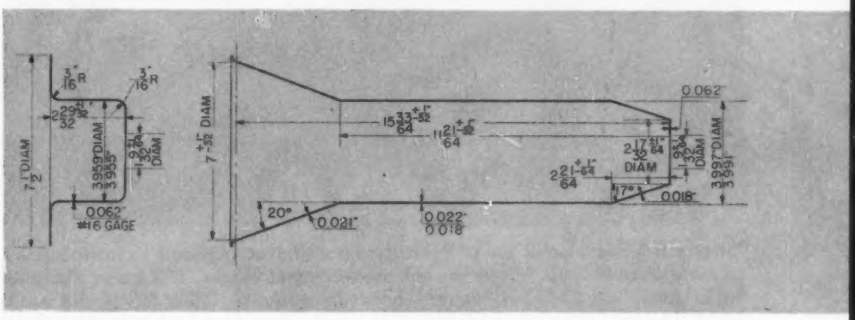
Spinning Blanks Often Start as Preforms

Another firm, Loren Cook Co., Berea, Ohio, manufactures a line of aluminum roof and wall ventilators. With the exception of the motors and fasteners, all parts of the units are spinnings. Some of the ventilators are made up of as many as five spun parts.

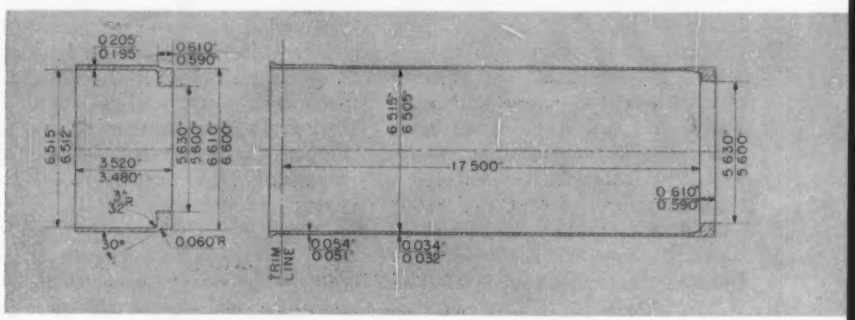
Most spinnings fall between 8 in. and 36 in. in diameter, but that's not the limit. For example, Roland Teiner Co. has spun shells smaller than a thimble and parabolic reflectors and wind tunnel bell mouths 16 ft in diameter. The photo on the cover is a dome for a roof ventilator being spun at Phoenix Products Co., Milwaukee. The 140 in. diameter blank (3003 aluminum) is spun into a part 120 in. in diameter and about 36 in. deep.

Cost Reductions—One of the big selling points of spinning is its low cost per piece. The cost of the first piece is usually far less than if it were produced by drawing. This low tooling expense continues to show up in the cost of the finished pieces until you reach a point where press forming results in a lower unit cost. Many parts start as spinnings in small lots; as quantity increases, they are deep drawn.

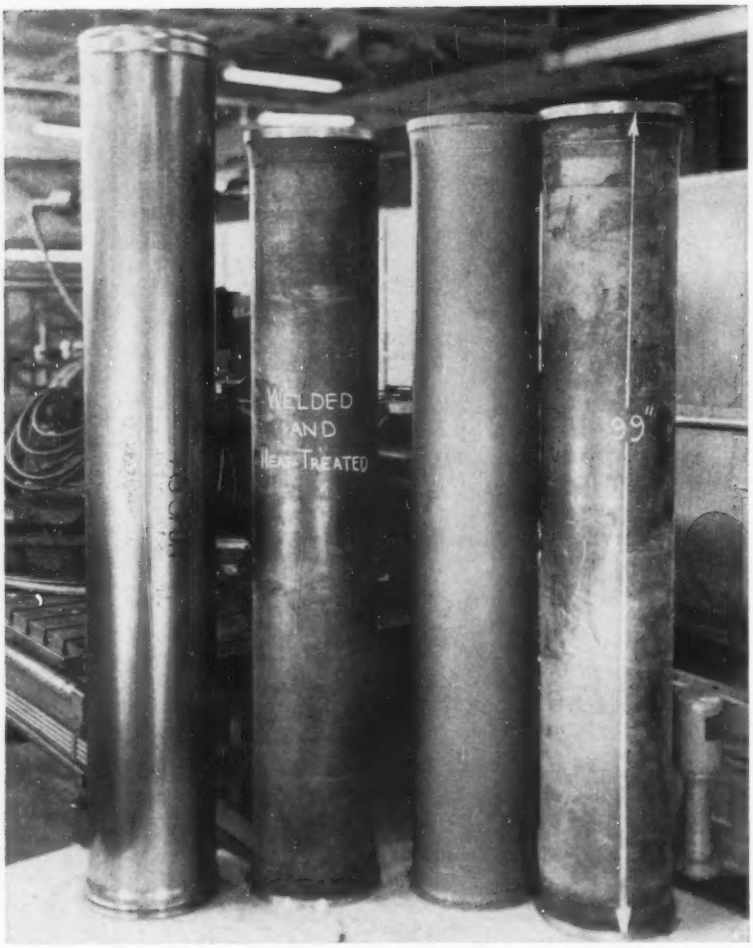
Some cost comparisons worked out by Phoenix Products Co. shows this clearly. The first five pieces of a deep drawn mild steel shell 12 in. in diameter would cost



SUPPORT CAN—Tolerances on this thin-walled tube have to be tight to allow bearings to be placed at opposite ends of the can. The part (Type 316 stainless steel) is spun on a Lodge & Shipley Floturn machine. The thickness required in the finished part and the angles that are necessary require a starting blank that is preformed in a press operation



MOTOR TUBE—This part is spun from a preformed blank made from a machined forging. Enough material is left on the flange end for final machining after spinning. The cylindrical section has enough material so the thin wall can be formed and still leave about 2 in. at the open diameter where the material thickness is increased 50 per cent



These tubes were spun on a Hydrospin machine at Ingersoll Kalamazoo Div. of Borg-Warner Corp. They started as 4130 steel blanks, 16¼-in. in diameter, 18 in. long, with 0.650-in. walls. The as-spun tube is 108 in. long and has a 0.100 in. wall. The other tubes have been heat treated and rings have been welded on the ends

drawn cone drops to $3.16, but the spun cone is still lower at $2.10.

Higher Strength — Another big factor in favor of spinning, particularly power spinning, is the improved physicals of the finished piece. Typical is a cone with a 34 degree included angle spun from cold rolled and annealed 302 stainless. The annealed material has a tensile strength of 85,000 to 90,000 psi, 50 per cent elongation, and 80 to 90 Rockwell B hardness. The finished cone has a tensile of 175,000 to 185,000 psi, 5 to 6 per cent elongation, and 30 to 35 Rockwell C hardness.

In power spinning, the metal being formed undergoes shear deformation, and grain structure is greatly elongated. The spun part also has high fatigue resistance; the surface of the part has no minute ruptures or tears in it.

Starting Blank—Often, it is best to combine the advantages of other forming methods with spinning to produce the final shape. C. L. Sporck, vice president, Lodge & Shipley Co., cites five methods of producing the starting blank for power spinning:

1. The simplest blank to obtain is the flat circle or square that can be produced from sheet or strip by shearing or blanking. It will produce a basic cone.

2. Blanks can be preformed in a press.

3. Sometimes, the starting blank can be obtained from a short machined forging. By combining this with a spinning operation, parts are produced that had been machined entirely from a forging. This is especially true in the jet engine industry where many of the bearing supports and housings are spun from machined forgings.

4. Starting blanks also can be centrifugal castings. When using a centrifugal cast preform, you should stay away from material that will give a dense structure. like stainless steel.

5. One of the most important methods is wrapping and welding sheet or extruded sections. The weld must be finish machined so it is the same thickness as the parent metal. After the part has been machined, it is annealed before spinning.

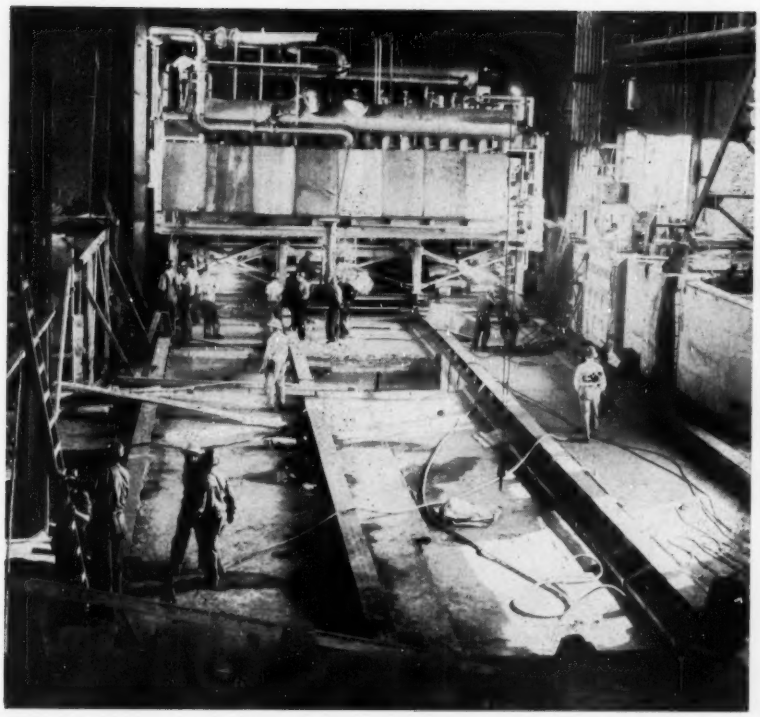
Example — Ingersoll Kalamazoo Div. of Borg-Warner Corp., Kalamazoo, Mich., is spinning long, thin-walled cylinders of 4130 steel on a Hydrospin machine. Starting as cylinders 16¼ in. in diameter and 18 in. long, with a 0.650 in. wall thickness, the tubes are spun to 108 in. long with a 0.100 wall thickness. The inside diameter stays the same.

Such long, thin-walled precision tubing can be used as hydraulic cylinders, pressure vessels, or missile tubes. The division also has spun tubes from cylindrical blanks fabricated from forgings, rolled and welded plates, and from centrifugal castings.

Assembly Machine — Normally, spinning is a production method used to produce parts. But on a new 12-station assembly machine built by Cimco Engineering Co., Ann Arbor, Mich., it is two operations in assembling the upper ball joint assembly of an automobile steering mechanism—closing a ball-joint socket.

Future—As a production process, spinning remained essentially the same until the introduction of automatic machines. But now it's being fully exploited. Having discovered the possibilities of the process, manufacturers want bigger and better machines.

Watch for Lodge & Shipley Co. to introduce a new machine that will spin cylinders 75 to 100 in. in diameter, with 0.050 in. walls, and 400 to 500 ft long.



End of the line. The 2000-ton furnace moves onto its permanent base in the bar mill building, which had to be enlarged to make room for it

Furnace Slides to Work

At Republic Steel's Buffalo plant, a 20 by 85 by 80 ft billet heating furnace has completed a 100 ft journey. It was built offsite and slid in place to save time

ERECTING a mammoth structure offsite, then sliding it into its permanent location is getting to be a standard method of steel plant construction. It has been done with blast furnaces, open hearths, and rolling mills. Latest to adopt the technique is the Buffalo District steel plant of Republic Steel Corp.

It has just finished moving a 2000-ton billet heating furnace onto permanent foundations from an erection site 100 ft away. The company figures that two months of shutdown time were saved by the method. The job was done with only three weeks shutdown.

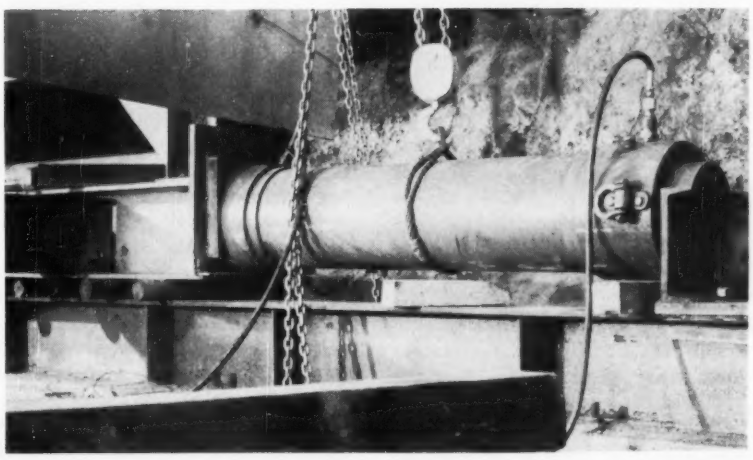
More Capacity—The new furnace is part of a program for completely rehabilitating the 14-in. bar mill. It has more than double the heating capacity of the furnace it replaces and sharply increases the capacity of the mill.

It was erected first on hundreds of 2¾-in. steel rollers riding on 12 in., H beam skids which led to the permanent foundation. While the old furnace continued to operate, excavation for new foundations went on around it. When the foundations were ready and the old furnace torn out, two powerful hydraulic jacks inched the new furnace into place. The move took 23 hours.

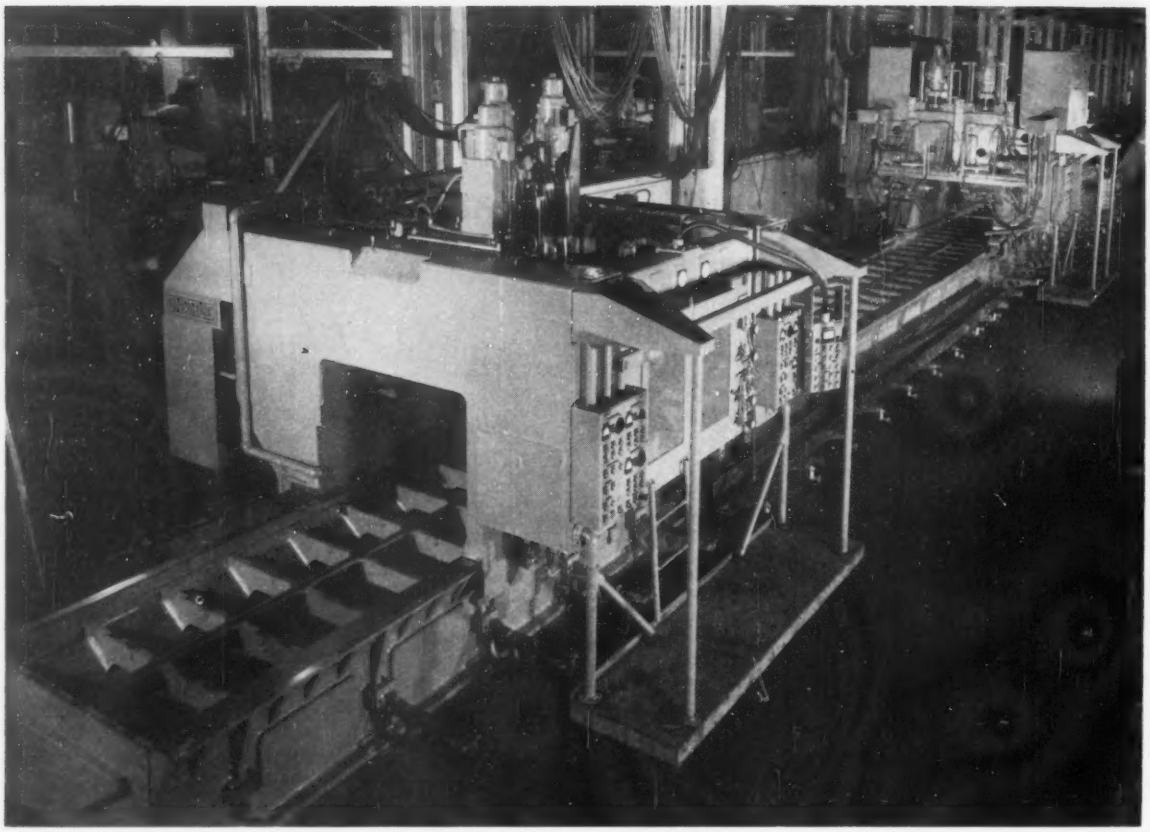
Rejuvenation—As soon as the old furnace was shut down, crews swarmed over other parts of the mill. Among improvements installed were a new shuffle bed (unscrambler), a new charging table, and a new billet turner.

A scraper for dry removal of scale was installed under the table. It reduces the chances of stream pollution by mill scale. Pinch rolls and hot shears were reconditioned. The hot bed was overhauled. Electrical controls were relocated to consolidate operations.

TV Control—A new feature is a closed television circuit which will enable a man at the discharge end of the furnace to charge billets at the entry end, 80 ft away. By watching the screen, he can tell when billets are properly positioned for charging. It is expected to add greatly to the efficiency and safety of the mill.



One of two hydraulic jacks which moved the furnace inch-by-inch into position. Movement was 54 in. per hour



This 96 ft long milling machine has six multiple feed heads for milling wing structural parts for Martin SeaMaster

Machine Does Variety of Jobs

Martin is using it to make parts for aircraft wings. The manufacturer can adapt it to any required width and length. It'll handle straight, tapered or contoured faces

A MILLING machine that handles any type of straight, tapered or contoured face is cutting parts for the wings of the new SeaMaster at Martin Co., Baltimore. It was designed by Onsrud Machine Works Inc., Skokie, Ill.

Large—The machine is 96 ft x 15 ft, 6 in. The bed working width is 60 ft x 36 in., with additional open area between the carriage uprights for work widths to 48 in.

It has 204 control stations, 49 safety switches and 43 electric motors. Coolant is used at the rate of 200 gallons a minute.

Flexible—Six milling heads are built on the two traveling carriages. All milling heads may be operated at one time or in any sequence required.

Fourteen tracer controlled milling feeds are possible in addition to the longitudinal feed of the carriage. Mechanical contact of tracers by followers is converted to electronic signals which control the feed positions of the cutter heads.

Design—The first carriage houses two vertical cutter motors. Each liquid cooled unit is a two-speed induction motor (3600 and 7200 rpm). Each has three electronic tracer controlled feeds which may be used separately or in any combination.

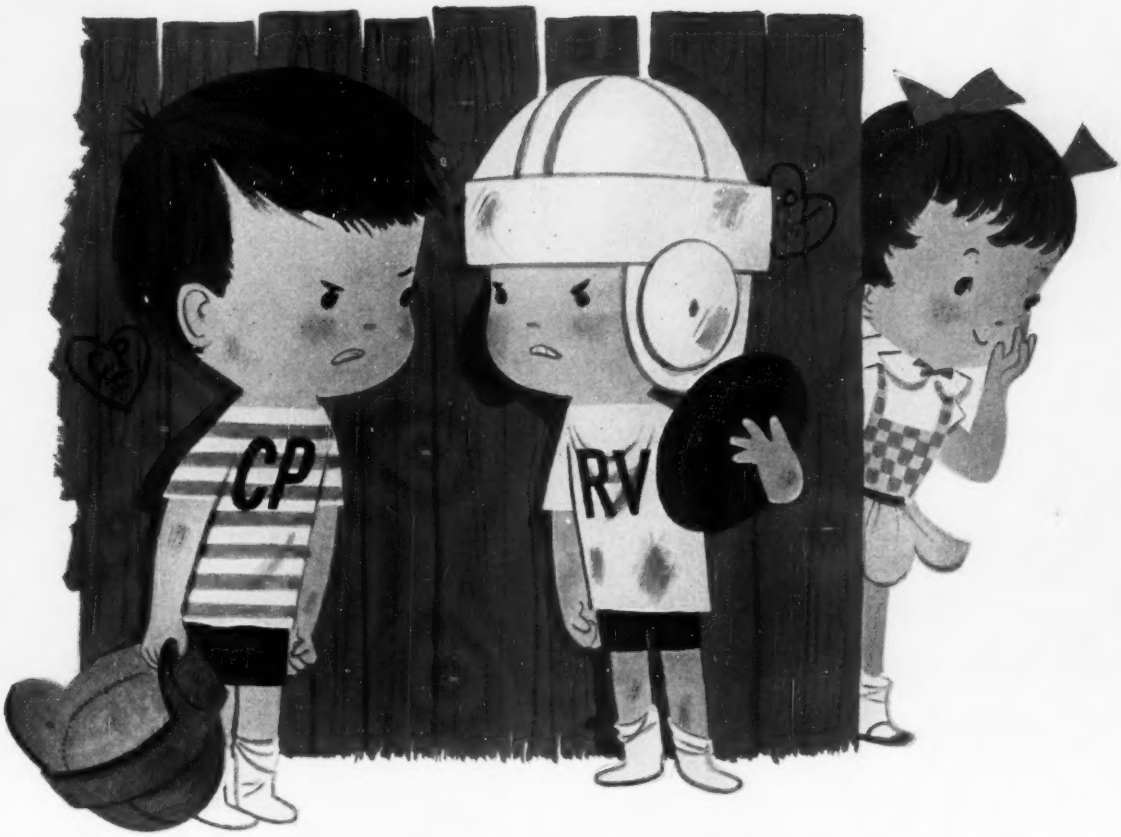
The feeds are transverse, vertical rise and fall and twist in a range of 20 degrees plus or minus from the vertical.

Four cutter motors are on the second carriage. Two are 100 hp with transverse and vertical rise and fall feeds.

A common slide supports the other two 60-hp motors. They are controlled as a pair for vertical rise and fall motion and twist motion of 20 degrees plus or minus from the horizontal. Their transverse feeds are independent of each other.

Longitudinal feed of the carriage is infinitely variable from 0 to 300 in. a minute.

USCOLITE PLASTIC PIPE



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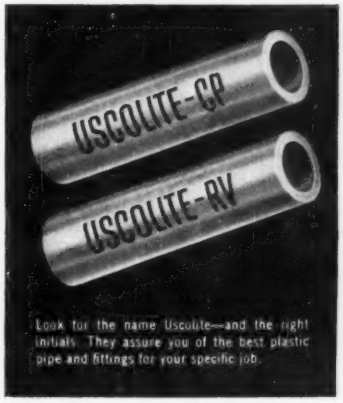

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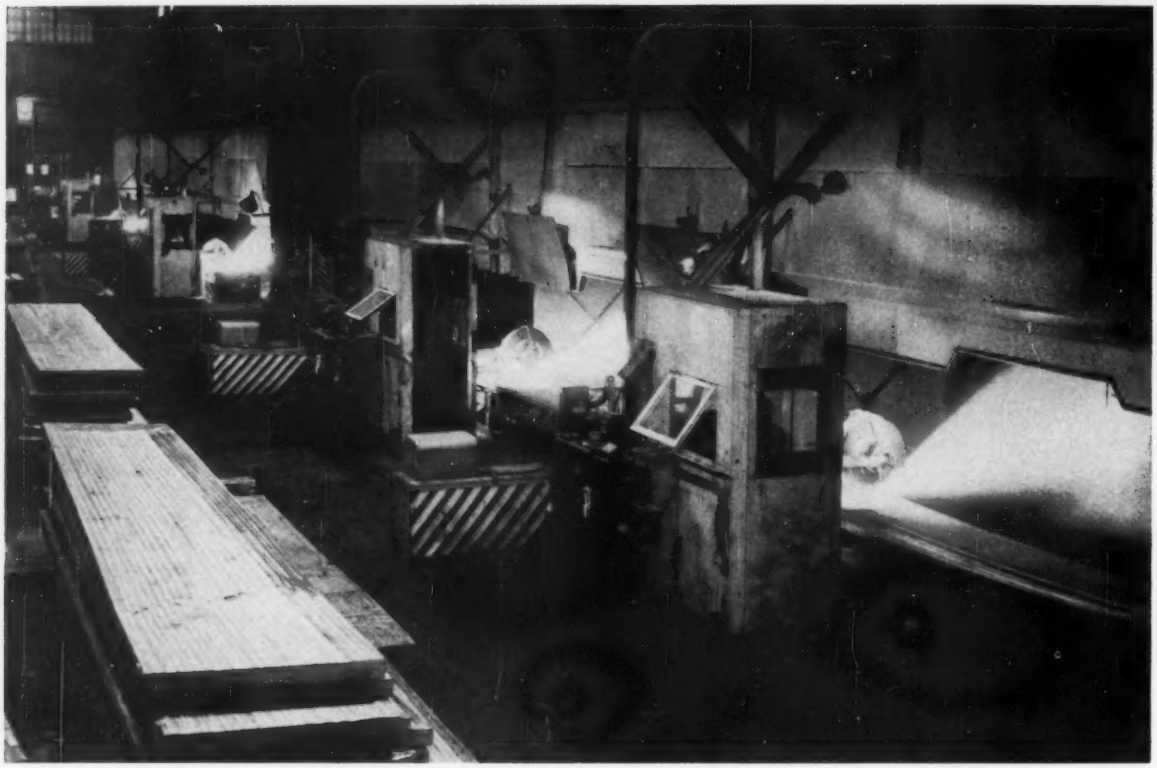

In steel mill slab conditioning departments . . .

Mechanization Cuts Slab Grinding Cost

By H. R. KERBER
Abrasive Engineer
The Carborundum Co.
Niagara Falls, N. Y.

Faster wheel wear is countered by much greater rate of metal removal. Hot pressed, high density wheels found best for mechanical slab grinders

THE MECHANICAL grinder is changing the complexion of one of the least attractive steel mill jobs. Operators no longer leave the slab grinding department at the first opportunity. Instead, they exercise their seniority to get a grinding machine.

It is necessary to grind (or condition) chrome and chrome-nickel steel slabs to remove the oxidized surface. This exposes seams and cracks which are then ground out —otherwise the defects would remain during rolling and finishing.

Grind in Comfort—Conditioning used to be done with the manually operated, swing frame grinder. The newer mechanical grinder eliminates hand labor. The operator sits comfortably in a cab. Using four main controls — two hand levers and two pedals—he duplicates the action of the manual grinder. Secondary controls regulate the speed of traverse, position the grinding head, and control the wheel head pressure.

Most enthusiastic acceptance of the mechanical grinder has been in industries which grind large slabs. Billet grinding with a mechanical grinder is still more or less experimental.

High Stress—Increased stress on the grinding wheel was one of the main problems created by the mechanical grinder (it can apply upward of 700 lb pressure to the grinding face of the wheel). The

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It's fine to have the giant equipment for heavy machining jobs. But equally important—it's vital to have the skilled workmen and engineering know-how for *precision* performance. We're proud to offer this unusual combination for *your* machining requirements on jobs that are big and tough to handle. (Illustration shows a blast furnace bell on a 20'0" vertical boring mill.)

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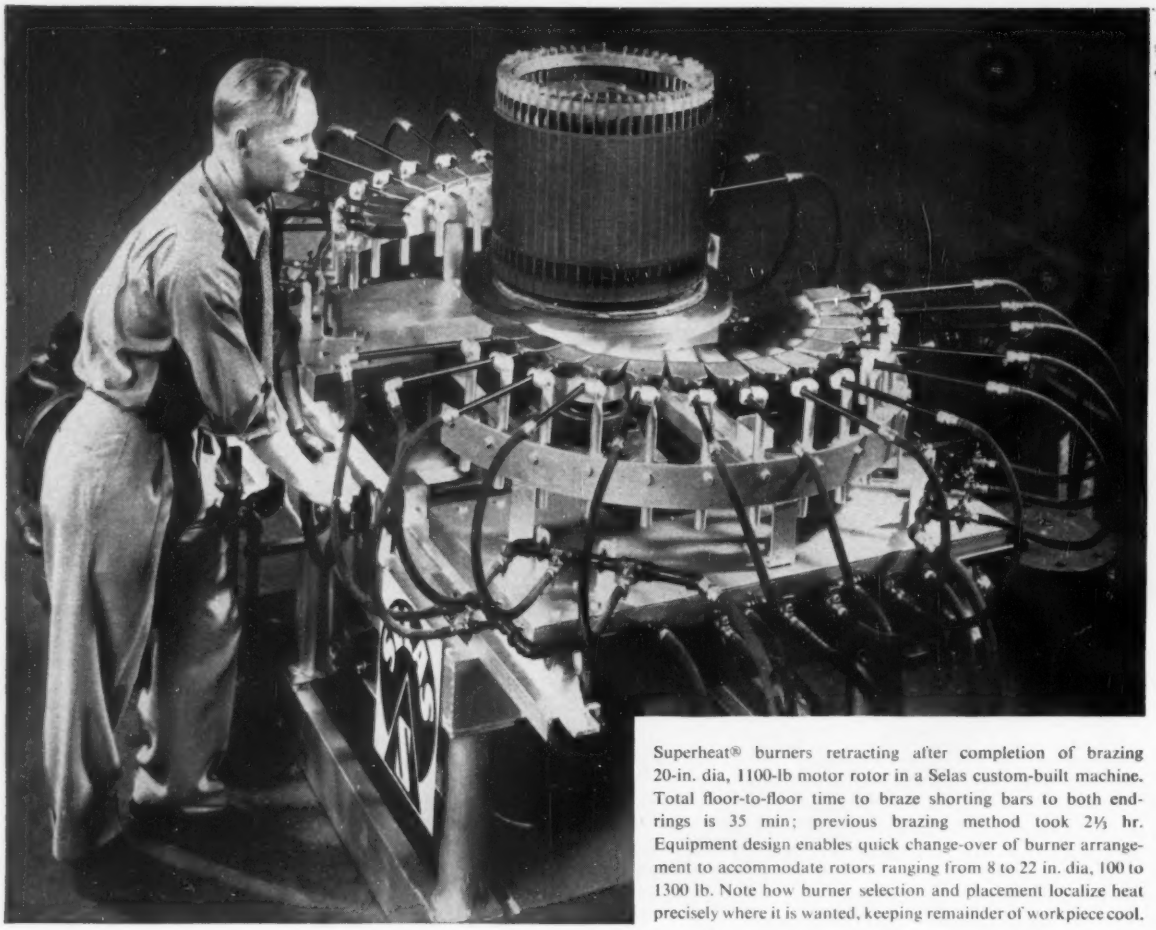
Selas-Brazing Saves 1¾ Hours in Motor Production



Superheat® burners retracting after completion of brazing 20-in. dia, 1100-lb motor rotor in a Selas custom-built machine. Total floor-to-floor time to braze shorting bars to both end-rings is 35 min; previous brazing method took 2½ hr. Equipment design enables quick change-over of burner arrangement to accommodate rotors ranging from 8 to 22 in. dia, 100 to 1300 lb. Note how burner selection and placement localize heat precisely where it is wanted, keeping remainder of workpiece cool.

This Selas Method of brazing rotors is currently employed by several large motor manufacturers . . . to accommodate a variety of diameters . . . with speedy change-over resulting from easily-adjusted gas-air burners. High heat transfer is achieved with low-cost city gas, no bottled oxygen is required. Brazing time is cut as much as one and three-quarter hours on large rotors, proportionately on smaller sizes.

In this, and in all Selas-Brazing machines, individual burner controls provide precise temperatures, specific heat patterns. Any acceptable filler metal (both copper and silver alloy are used with the machine illustrated) may be hand-fed or pre-placed. Reproducible uniformity, not possible with other methods, is achieved. Only simple labor skills are needed to meet modern production requirements with these versatile, compact, space-saving brazing machines.

Selas-Brazing machines are custom-built to meet specific workpiece demands. Selas engineers welcome the challenge to design and build equipment to serve your joining needs.

For more information on how Selas-Brazing is utilized in a wide range of metal-joining applications send for new bulletin No. 210—"Production Brazing and Soldering" and reprint "Mechanized Heating Puts Brazing on the Production Line."

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DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

constant traverse rate and the power of 40 and 60-hp motors, set up high stresses on the wheel.

At Carborundum Co.'s grinding laboratory, extensive tests have been conducted on the effect of pressure applied to the grinding wheel. Test results have led to the following conclusions:

1. There is a maximum pressure that can be applied to a wheel beyond which it will break down at an uneconomical rate.

2. Up to this pressure, an increase in pressure produces faster metal removal.

3. Hot pressed wheels are much more efficient than cold pressed wheels.

Many users of mechanical grinders have conducted their own experiments, and the results are somewhat diverse. One concern concluded that 350 to 400 lb pressure gave most efficient results; another found the best pressure between 475 and 525 lb. (Wheel size in each case was 24 x 3 x 12 in.; abrasive wheel specifications were the same).

Correct pressure undoubtedly will be decided by each user through trial and error. Thus far, the 600 to 650-lb range has been too high for efficient abrasive performance. However, wheels in the development stage may make this pressure range efficient soon.

Traverse—The traverse rate of the machine is left, more or less, to operator decision. When the surface of the slab appears clean and the scale thin, the operator, with a head pressure of 400 to 500 lb, can traverse at about 50 to 60 fpm.

For heavily oxidized slabs, it is best to reduce the rate to at least half—to give the wheel sufficient time to penetrate the scale and remove, in the first pass, many of the minor and shallow defects. This should reduce the number of spots which must be reground and allow the operator to concentrate on the deep seams and cracks.

Faster Grinding — Production rates change materially when the mechanical grinder is adopted, with a large increase in pounds removed per hour. With hand-operated machines, removal rates of 50 lb per hour were considered good.

Mechanical Grinding at Steel Slabs

Speed Changes With Wheel Wear

Changes	Diameter	RPM
24 x 3 x 12-in. Wheel		
Start	24	1512
1	22	1649
2	20	1814
3	18	2016
20 x 2½ x 6-in. Wheel		
Start	20	1814
1	18	2016
2	16	2268
3	14	2592

Mechanical grinders are recording rates of 150 to 180 lb of metal removed per hour using wheels 24 x 3 x 12 in. Wheels 20 x 2½ x 6 in. have achieved removal rates of 60 to 115 lb per hour (in this case the head pressure is generally in the 300 to 400-lb range).

Users can depend on an operator to produce approximately 1 ton per hour. This is quite a change from the ½ ton or less per hour of a few years ago with a manually operated machine.

Shorter Life—Increases such as these are not gained without sacrifice: In this case, the life of the grinding wheel. On hand-operated machines, life of 14 to 18 hours was considered satisfactory for a wheel size 24 x 3 x 12 in. On the mechanical grinder a life of 6½ hours (4½ hours contact time) is considered satisfactory.

This high abrasive consumption does not nullify production gains. Savings of $7 per net ton ground have been realized by some companies. Much of this comes from increased production rates. In one instance, six mechanical grinders are equaling or exceeding the production of 12 manually operated machines. Another factor that contributes to the efficiency of mechanical grinders: One machine can utilize two and sometimes three benches.

Good Technique—The operator can contribute much toward efficiency. While the mechanical grinder eliminates physical effort, it does not eliminate the use of good technique.

When an operator on a manual grinder generates too flat a wheel face, the wheel begins to bounce or vibrate. He then tilts the machine to grind with a corner of the wheel and smooth cutting action begins anew. With a mechanical grinder, the operator can see this vibration but cannot feel it. If he is slow in changing the wheel position, the result may be severe spalling and damage to the wheel.

Watch Edges—Another point of caution: When approaching the end of the slab, the operator must be careful not to let the wheel run off. When this happens the natural reaction is to quickly reverse direction, causing the wheel to hit the end of the piece. It is possible to stun or damage a wheel in this manner.

When grinding the front or rear edges of the surface, the wheel should be no closer to the corner than ½ in. The edge of the slab acts like a dressing tool, wasting many inches of usable abrasive. When it is necessary to grind the corner, the wheel should be vertical rather than tilted, and the head pressure reduced if the pressure control is in the cab.

Speed Control—Correct operating speed is important for the wheel to perform at maximum efficiency. The operator can control this from his cab. Rings may be stencilled on the side of the

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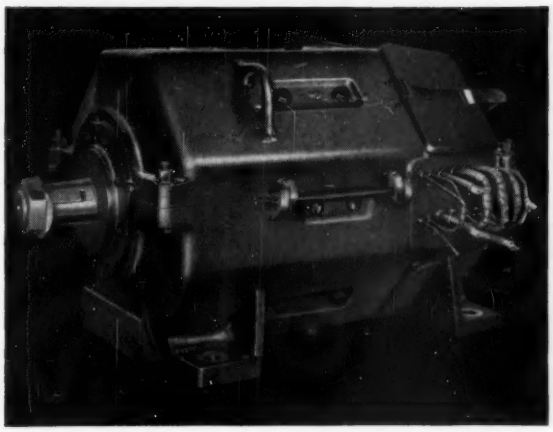

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SLAB GRINDING . . .

wheel to indicate when speed should be increased. Recommended speeds and speed changes are shown in the chart.

Personnel assigned to mount wheels should be careful to place the new wheel on the wheel mount so the rings are topside or away from the V-belt pulley. Placed this way, the operator can see the rings and be reminded when a speed change is due.

Wheel Changing—When removing the used wheel from the hub, the stub should be examined to see if there has been excessive slippage, usually indicated by a worn or shiny section in the arbor hole. If slipping flanges are tightened excessively, they may spring and not grip the wheel properly. The wheel bearing surface of the spindle should be cleaned, and any old blotting paper scraped from the flanges. Flanges also should be checked for burrs and distortion.

If possible, extra wheel heads should be provided for machines using demountable heads. Floor space should be set aside where millwrights can remove the used wheel and install a new one. This will minimize delay.

As a wheel approaches stub size, a new wheel and mount can be placed in a holder between the benches. The used wheel and mount can be removed and the machine moved to the new wheel, mounted, and operation resumed. A crane can pick up the used wheel and deliver it to the changing area where it will be made ready for the next machine to require a change.

The mechanical grinder is a capital expenditure. Constant preventive maintenance should be practiced to keep it operative with special attention to hydraulic lines, pumps, bearing seals, transmission, and traversing and oscillating mechanisms. Since wheel and machine operate under severe conditions, the best wheel will not deliver optimum performance unless the machine is in good condition.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

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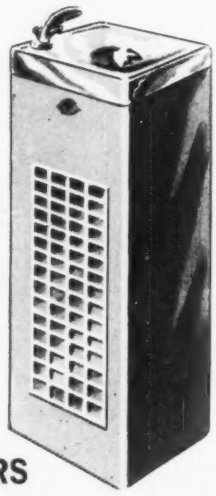

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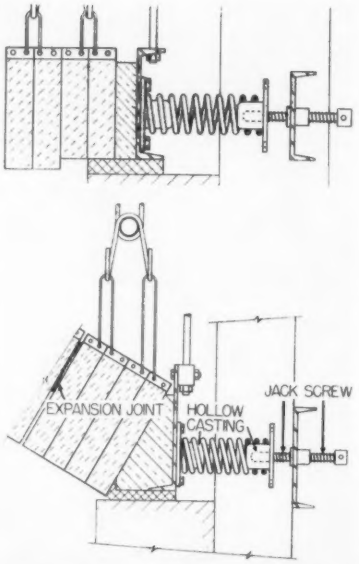

Reintjes spring construction applied to flat and contoured suspended roofs

No Skewback Twist

Spring and expansion joint construction compensates for uneven expansion of refractories

THE SPRING LOADED floating skewback has become a standard method of construction for open hearth and other reverberatory furnace roofs. It compensates for expansion and contraction in the roof.

However, the heated lower portion of the roof refractories expands more rapidly than the upper portion, putting a twist in the skew. The Geo. P. Reintjes Co., Kansas City, Mo., has devised a simple and economical method of compensating for the twist.

Expansion Joints—The Reintjes design divides the entire roof into squares about 18 x 18 in., with fixed expansion joints separating each square. Seal plates prevent excessive air infiltration through the expansion joints.

To compensate for additional expansion, a casting with a hollow boss is bolted to the skewback. A heavy spring is seated over the boss, and an identical casting is slipped into the other end of the spring. A standard jack screw, threaded through the skewback channel and seated in the casting at the free end of the spring, puts tension on the skewback.

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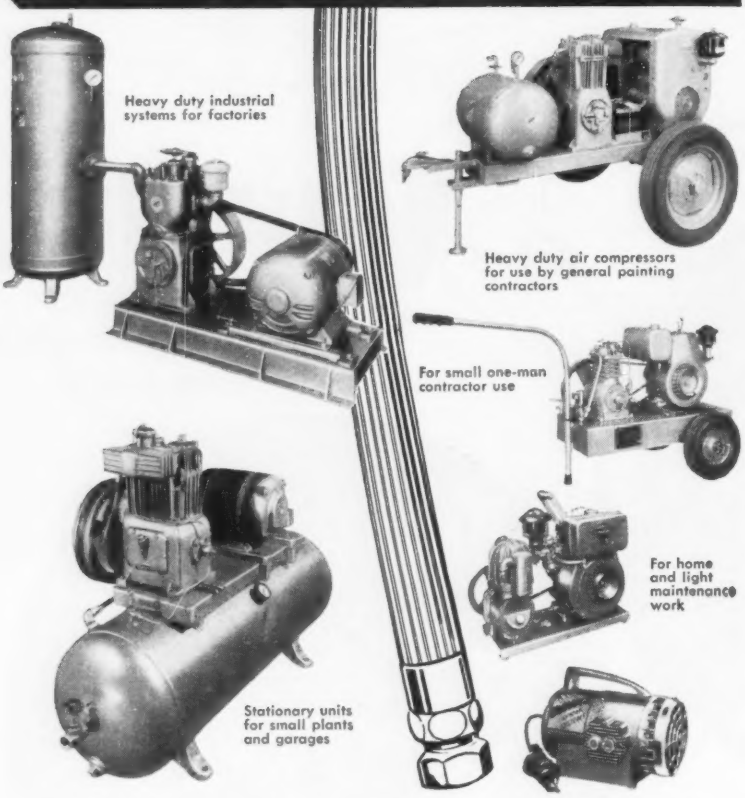
Heavy duty industrial systems for factories
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For each job there is an air compressor that is just right...one that gives you the volume and pressures you need with maximum flexibility and economy. The Binks Line of air compressors gives you a choice of 50 models from compact ¼ h.p. portable units to almost any size you need...each designed to do a specific job or to fit into a given air supply system. Before you buy or specify a new compressor, investigate the Binks Line...it will pay you!

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Ask your distributor or write direct to us for copies of **HOW TO SELECT AN AIR COMPRESSOR** and **BINKS CATALOG 820.** They will tell you what to look for in an air compressor and show you available models, accessories, etc. No obligation.

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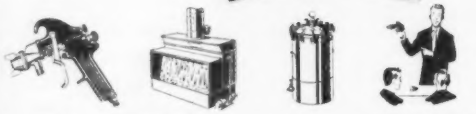

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Ore Car Handling Eased

Radar used in semiautomatic retarding system, unusual feature of new sintering plant

GRAVITY and radar will combine forces to spot hopper cars at U.S. Steel Corp.'s new sintering plant near Butler, Pa. It's the first semiautomatic car handling and retarding system for a sintering plant, says the maker of the equipment, Union Switch & Signal Division, Westinghouse Air Brake Co., Pittsburgh.

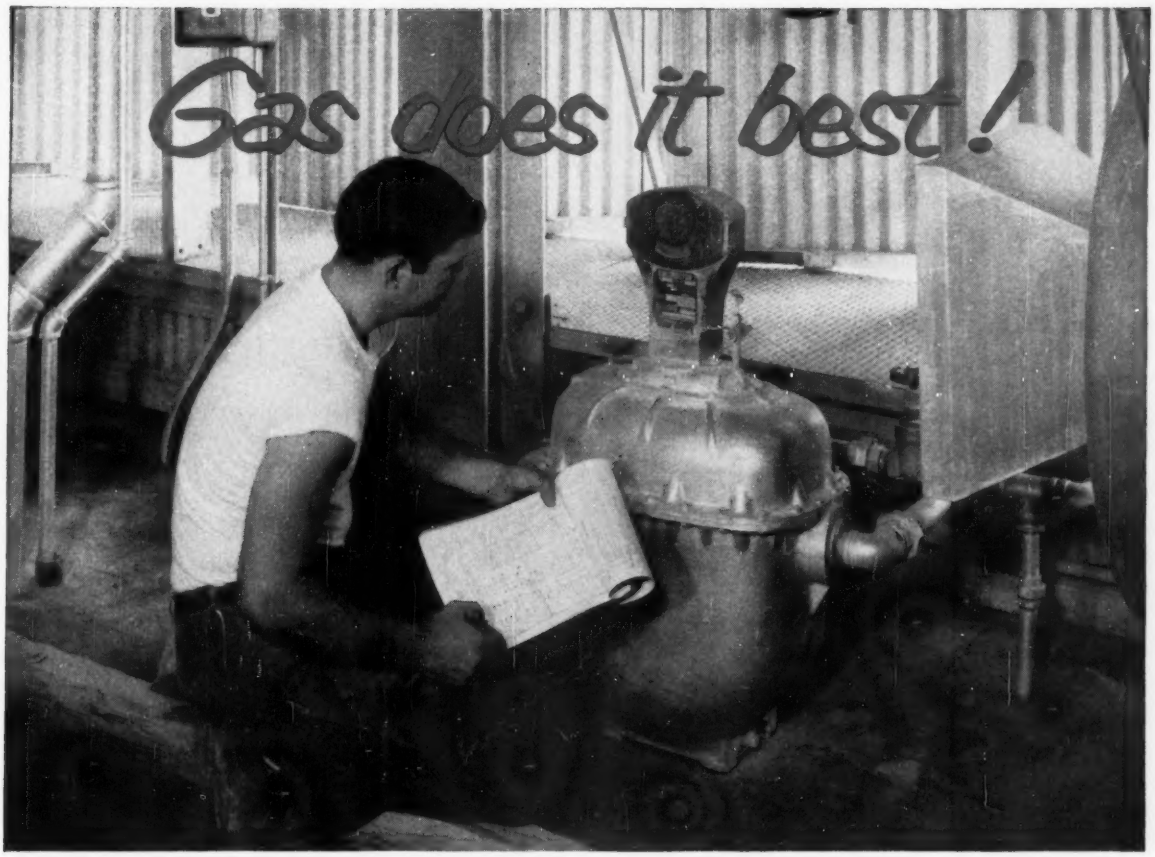
To help fill growing demand for sintered ore from the corporation's Pittsburgh area operations, between 35 and 40 cars an hour will unload their cargoes at the plant. Much of it is foreign ore, unloaded at docks in the East and brought to Butler by rail.

Automatic Operation — A yard engine will push cars to a dumper for unloading. After unloading, they will roll individually, by gravity, down a grade toward a car retarder and empty car yard beyond. Automatic control equipment, using radar to measure car speed, will operate the retarders to obtain a preselected leaving speed from the retarder. The car will then roll, still by gravity, through remotely controlled switches onto its proper track. The empty car yard will hold 219 cars on four tracks each 1800 ft long.

A single operator in a control tower near the retarder will select the desired speed by pushing one of four pushbuttons from a desk-type control unit. He can also control position of switches. Car leaving speeds will vary from 3 to 13 mph.

Air operation of the car retarders combines instant operation with firm braking force. Any number can be installed on either rail to obtain required amount of braking effort. The equipment eliminates a dangerous job—car riders who mount cars to manually control their speed.

Sintering plants have been enjoying unprecedented growth since 1950, with annual sintering capacity now close to 60 million tons. There will soon be few blast furnaces without an adjacent sintering plant. More sintering plants are also being built at the mines.



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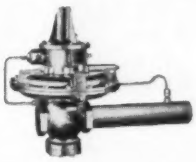
When you process with gas, metered records of consumption will quickly show up combustion deficiencies that affect the quality of your end product. Meters standing guard at every burner will discourage wasteful fuel practices. And only from metered records of the fuel used can you arrive at accurate costs.

Why don't you investigate the advantages of metering individual furnaces, kilns or ovens? Learn the economies of using Rockwell meters as production tools. *Write us or use the handy coupon.*

Good Combustion Requires Close Regulation

For Low Pressure Burners



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Good combustion control is the key to good process control. Rockwell makes a complete line of pressure regulators for all types of industrial burners. Use the coupon for full details.

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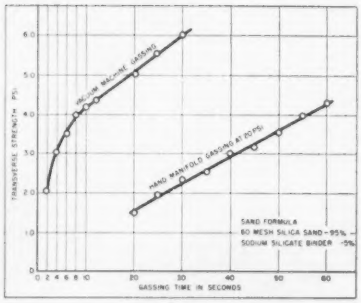
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GASSING TIME IN SECONDS

Transverse tests were made on 1 x 1 x 8 in. specimens at 6 in. centers. Vacuum gassing times are those of the dwell period

Faster CO_2 Cores

A multicycle vacuum gasser uses less CO_2 and hardens cores faster than gassing by hand

By D. C. EKEY and E. G. VOGEL
Technical Director Research Engineer
Lebanon Steel Foundry
Lebanon, Pa.

USING a vacuum CO_2 gassing machine developed by Alphaco Inc., York, Pa., has these advantages:

- Cores have improved quality.
- Susceptibility of treated cores to moisture deterioration is greatly reduced.
- Fixtures and vents are eliminated.
- Less CO_2 is used.
- Production is increased.

The Test—The Specialty Foundry at Lebanon Steel produces a substantial quantity of CO_2 cores and molds; much of the work is small to medium in size. A great variety of patterns is in use, and the runs tend to be too small to warrant elaborate setups.

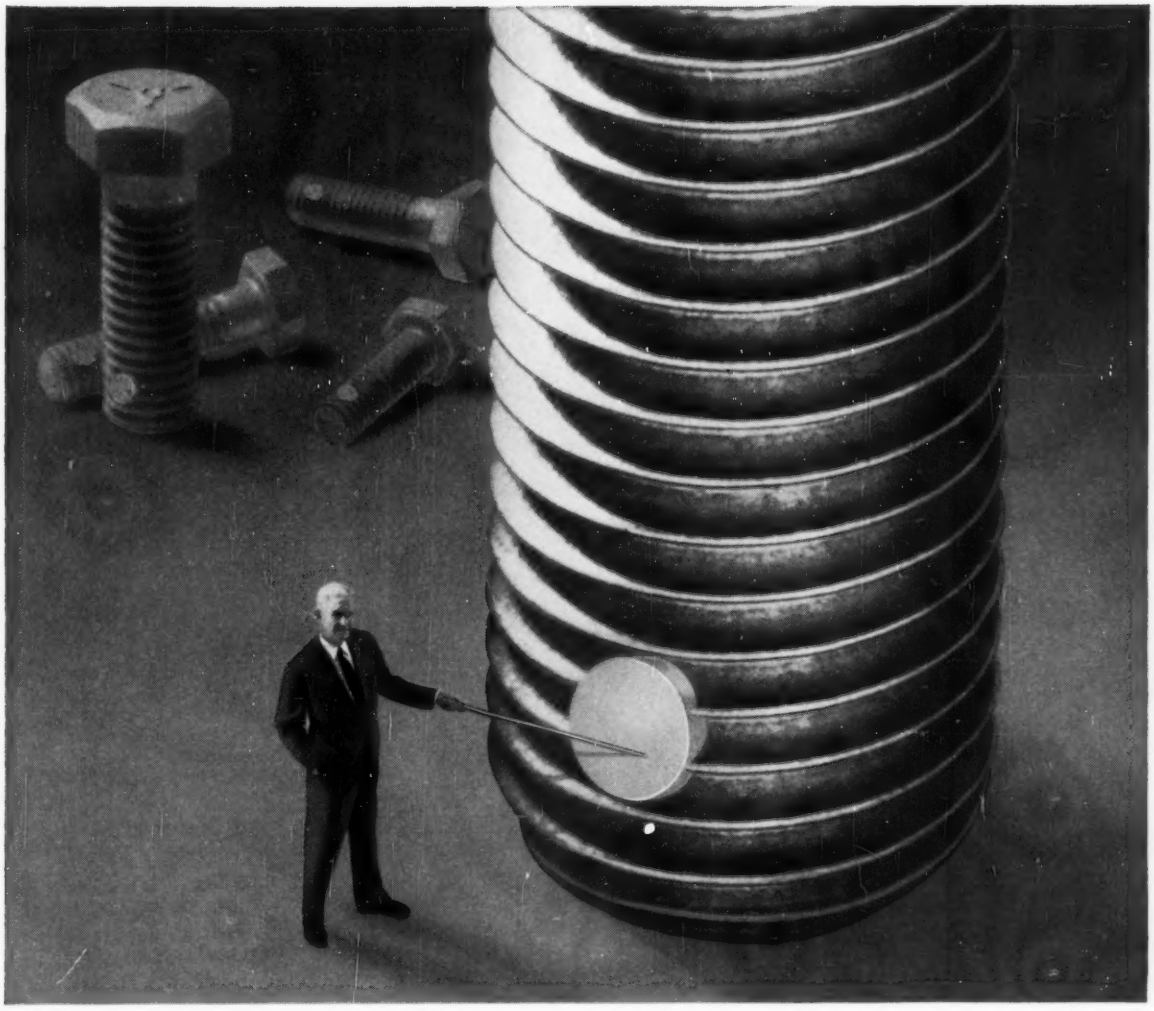
The vacuum gassing of these cores on a production basis was observed for a period of three months.

Results — CO_2 consumption is less than a third of the amount formerly used.

Cores are cured uniformly; edges and corners in deep, blind recesses are hard, and scrap caused by drawing soft cores from the box is eliminated.

All rigging has been eliminated; there are no problem jobs.

Stab gassing is no longer needed,



Cleveland Nylok self-locking hexagon head cap screws hold tight, speed production, simplify design

NOW STOCKED IN ALL STANDARD SIZES FROM ¼ TO 1 INCH

A Cleveland Nylok* hexagon head cap screw is self-locking — won't work loose. The locking device is a tough, resilient pellet of nylon that forces the mating threads together in a secure metal-to-metal union. All auxiliary locking devices are eliminated. Seated or unseated, the screw locks wherever wrenching stops. And because of "plastic memory," the pellet tends to recover its original shape and the screw can be used repeatedly.

These self-locking cap screws give uniform torque and will not gall or damage threads or seating surfaces. They are not affected by aging or by temperatures from −70° to +250°F. Further, when screws are properly seated, the locking pellet functions as a liquid seal.

You will save on production time when you use Cleveland Nylok self-locking screws. In addition, you can simplify design and reduce size, weight and inventory. Contact your Cleveland distributor for these self-locking screws in all standard sizes from ¼ to 1 in., in high carbon quenched and tempered steel (C-1038).

*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

Write today for your copy of the Cleveland Nylok folder giving complete technical data and specifications on self-locking hexagon head cap screws. We can also supply other standard and special screws with the Nylok self-locking feature.

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Vice President in charge of throwing money away

It's his job to get rid of the plant "waste." And very often in the most expensive way possible – by literally throwing it away.

We don't know just how much money in various forms of precious metal waste is lost annually by industry. Lost by dumping, by pumping or by being removed by a local salvage operator.

Here, at Handy & Harman, we have actual case histories in which impressive amounts of money in waste form were lost for years. That's why we've included this check list of various kinds of valuable waste. If your plant disposes of any of these materials (or similar ones), it will pay you to investigate Handy & Harman's refining service. Send a trial lot to the Handy & Harman refinery nearest you for accurate evaluation. We offer unsurpassed facilities and experience for complete recovery. If you're not sure of the value of waste you are throwing away, let us check a sample for you. You may discover an entirely new source of income. Write or call our Refining Division today.

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Gold Plating Solutions
Silver Precipitates, Sludges & Sediments
Gold Precipitates, Sludges & Sediments
Silver Coated Copper Wire & Racks
Gold Coated Copper Wire & Racks
Filter Pads
Silver Anode Ends
Silver Tank Scrapings

Production Operations

Silver Turnings, Chips, Shavings
Silver on Steel Bearings
Silver Steel Turnings
Silver Blanking Scrap, Stampings, Strip, Wire
Silver Grindings
Silver Copper Scrap
Silver Powder Mixtures
Silver Screen Scrap
Silver Solder Scrap
Silver Brazing Alloy Scrap
Silver Contact Scrap
Silver & Gold Bi-Metal Scrap
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and the detrimental effects of excess CO_2 concentrations in the work area have been eliminated.

Cores can be vacuum gassed in the box, on driers, or after they are stripped. It is easy to gas sand mixtures of low permeability.

A chamber full of cores can be cured in the same cycle time as one core.

The Machine—A double cycle features the operation of the gasser. The chamber is evacuated, pressurized with CO_2, re-evacuated, and again pressurized with CO_2.

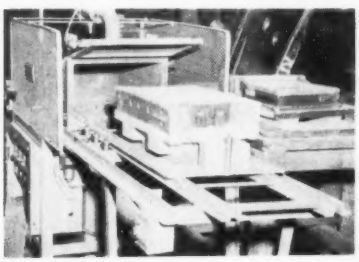
When the vacuum is equal to 28 in. of mercury, the gas mixture of the first cycle consists of 93.3 per cent CO_2 and 6.7 per cent air. In the second cycle CO_2 is 99.5 per cent, air is 0.5 per cent.

The high CO_2 concentration and the mixing action resulting from the double cycle combine to produce fully cured cores and molds.

(Previously, experiments were made with a chamber which pulled a single vacuum. Cores teeated by this machine were only surface cured, and deep curing in the box took too much time.)

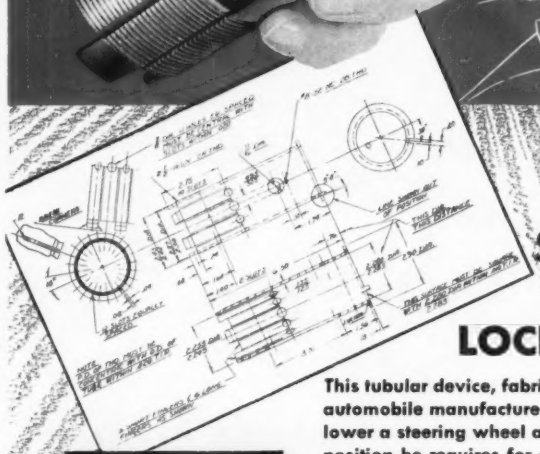
Typical Cycle—It takes 12 to 18 seconds to pull the first vacuum. CO_2 enters the chamber until atmospheric pressure is reached, then held. Time: 2 to 5 seconds. A second vacuum is pulled. This takes 12 to 18 seconds. CO_2 is again introduced and held; total time is 8 to 12 seconds. This last period, the dwell time, has the greatest influence on the degree of curing obtained.

The graph, shows how longer dwell times increase transverse strength. Strengths and times for



This vacuum unit has a capacity of 2 cu ft. Other machines have chambers 12 in. high and 16 x 24 or 24 x 24 in.

Michigan
Electric Resistance WELDED
STEEL TUBING
Always makes possible Better products at lower Cost



Automotive Steering Wheel
HEIGHT
LOCKING DEVICE

This tubular device, fabricated by Michigan for a major automobile manufacturer, enables the driver to raise or lower a steering wheel and lock it into the exact elbow position he requires for greatest driving comfort.

A hand nut on the locking sleeve is turned counter-clockwise one-half and locked at the desired height by a one-half clockwise turn.

The utmost dimensional accuracy is required for this intricate part, which requires a multiplicity of exacting operations for smooth, reliable functioning. It is still another example of the ability of Michigan engineers and production workers to meet the needs of product manufacturers for difficult tubing fabrications produced in volume at low cost.

You are invited to check the dimensions in the drawing at the left. It illustrates the type of problems that our engineering staff is always prepared to solve for Michigan customers.

We will welcome the opportunity to place at your disposal the many years of design and production skills that make Michigan tubular products so superior, so dependable, so economical.

ROUND
¼" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
⅜" to ¾"	16 thru 22	
¾" to 1"	11 thru 22	⅝" minimum side to 5" maximum side
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Michigan Tubing

has uniform strength, weight, ductility, I.D. and O.D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

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Here's what Morse's entry into the "Timing"® Belt field means to you...

Nobody gives you a more impartial analysis of your power transmission problems than Morse, because . . .

only Morse offers all four of these basic drives plus a complete line of power transmission products

Basic Drives: Roller Chain, Silent Chain, Hy-Vo Drives and "Timing" Belt.

Chain: H-E, 8-series, Double-Pitch, Implement, and Attachment; AL, BL, and Rollerless Lift Chain; Industrial Standard and 3/16″-pitch Silent Chain.

Stock Sprockets: Plain Bore, Finished Bore, Taper-Lock—also made to order.

Couplings: Flexible Roller Chain Couplings, Flexible Silent Chain Couplings, Morflex Couplings, Morflex Radial Couplings, Marine Couplings.

Driveshafts: Morflex and Radial Driveshafts.

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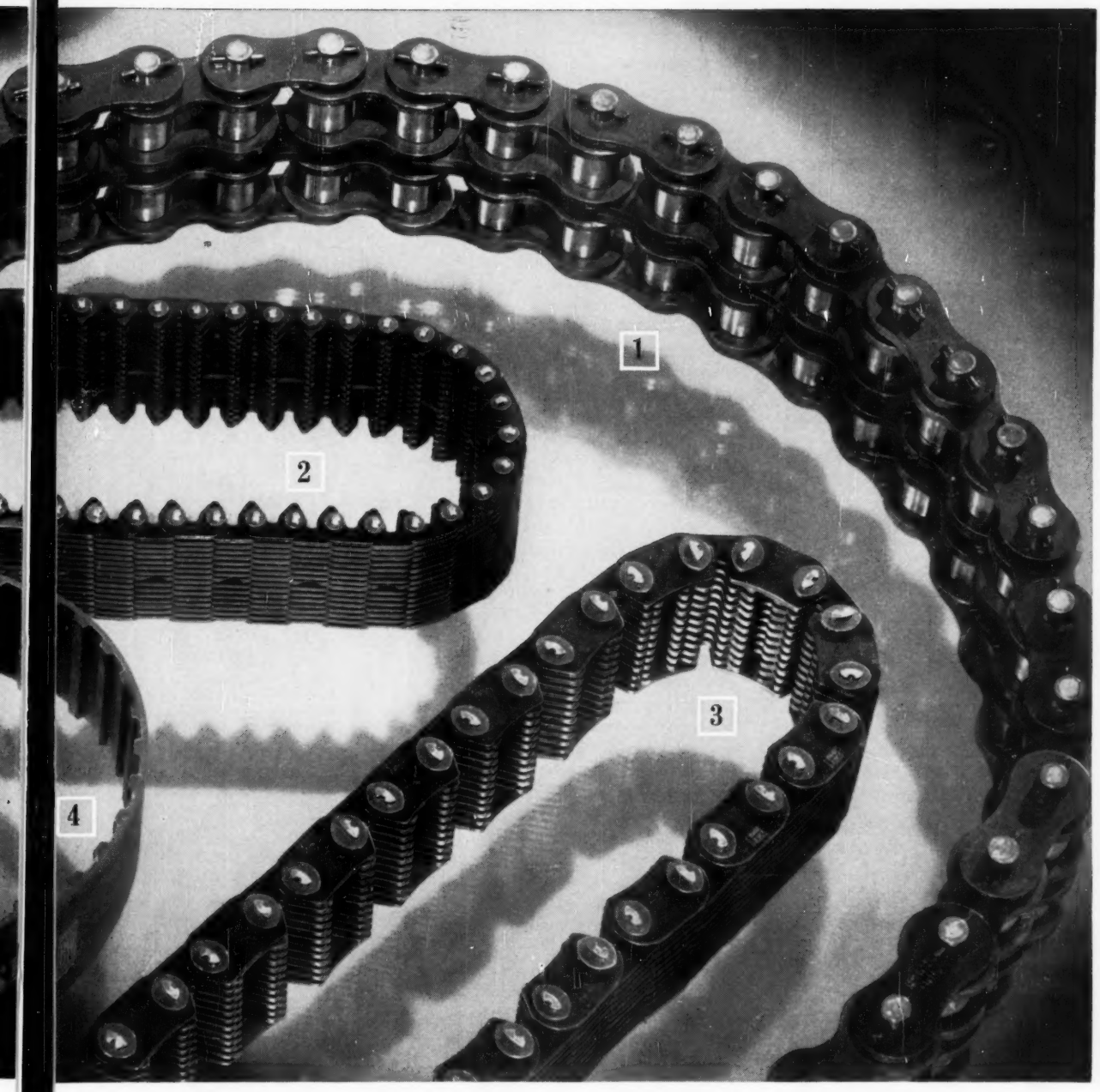
Speed Reducers: Eberhardt-Denver "RW" poweR-gear® Reducers; Gearmotors; "L" Worm Gear Reducers; "VX" and "DVX" Conveyor Drives; Miter Boxes; Helical Reducers.

Torque Limiters.

Look for your local Morse distributor in the Yellow Pages under "Power Transmission," or write: *MORSE CHAIN COMPANY, DEPT. 2-97, ITHACA, NEW YORK; Export Sales: Borg-Warner International, Chicago 3, Illinois.*



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2. **Silent Chain** . . . for smoother, quieter operation at higher speeds. In Morse Silent Chain the patented rocker joint operates with less friction and wear. It provides a cooler-running chain drive, with higher efficiency and longer service life.

3. **Hy-Vo Drive** . . . for extremely high speeds and horsepower. Exclusive with Morse, extra-tough Hy-Vo Drives transmit mile-a-minute speeds, and up to 5,000 hp loads; require minimum shaft space, usually eliminate outboard bearings.

4. **"Timing" Belt** . . . for light weight and lubrication-free operation. Morse "Timing" Belts give positive, high-efficiency transmission from 0 to 16,000 FPM, 1/100 HP to 1,000 HP . . . provide slip- and stretch-proof service for life of drive.

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FASTER CO_2 CORES . . .

hand gassing (of the same sand mixture) are also plotted on the chart.

Usually, a transverse strength of 4 to 5 lb is adequate for good handling. Higher strengths are justified only when the core or mold is to be used shortly after gassing and doesn't have time to air harden.

Machine gassing enables the operator using a limited number of dryers to increase production. All the dryers are filled and are then gassed simultaneously. The dryers are then returned to the coreblower.

Gas Consumption—The chamber of the vacuum machine is 15 x 24 x 10 in. high. When the machine is not loaded to capacity, wooden blank-off blocks are used to occupy the excess space. The blocks require only a few seconds to position and are changed only at the end of the run.

This arrangement holds waste gas to about 0.1 lb (cost: 0.5 cent) per machine cycle.

Cost of CO_2 with the vacuum process is estimated to be less than $1 per ton of cured cores.

Cores so made for immediate use have a higher initial hardness than those produced by other methods. This method is economical because the gas is not being dissipated during the longer curing interval.

Experimentation — Before the vacuum unit was put into production, a major test program was undertaken in the sand laboratory.

Results indicated that cores gassed in the box are about equal in strength to those stripped before gassing. The slightly reduced strength of the stripped cores may have been caused by the rapping required to remove them from the box in the noncured state.

The effect of preheated CO_2 was investigated. The gas was heated to 20 temperatures between room temperature and 1000°F. There was no correlation between gas temperature and transverse strength.

Shelf storage increased the strength of vacuum treated cores above that of hand gassed cores for one sand mixture tested. Strength of the vacuum core after 24 hours was about 23 psi, that of a core gassed by hand (for 20 seconds) was about 17 psi.

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Strictly stag — is this all male haven for good drinks, good food and good talk. Plus sports events on TV.

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Pause — in the relaxing, informal atmosphere of the gayly decorated Patio. It's a Cleveland habit to say — "Meet me at the Patio."

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Service is brisk and decor cheerful in the modern, air-conditioned coffee shop. Enjoy a tasty sandwich or a moderately priced meal.

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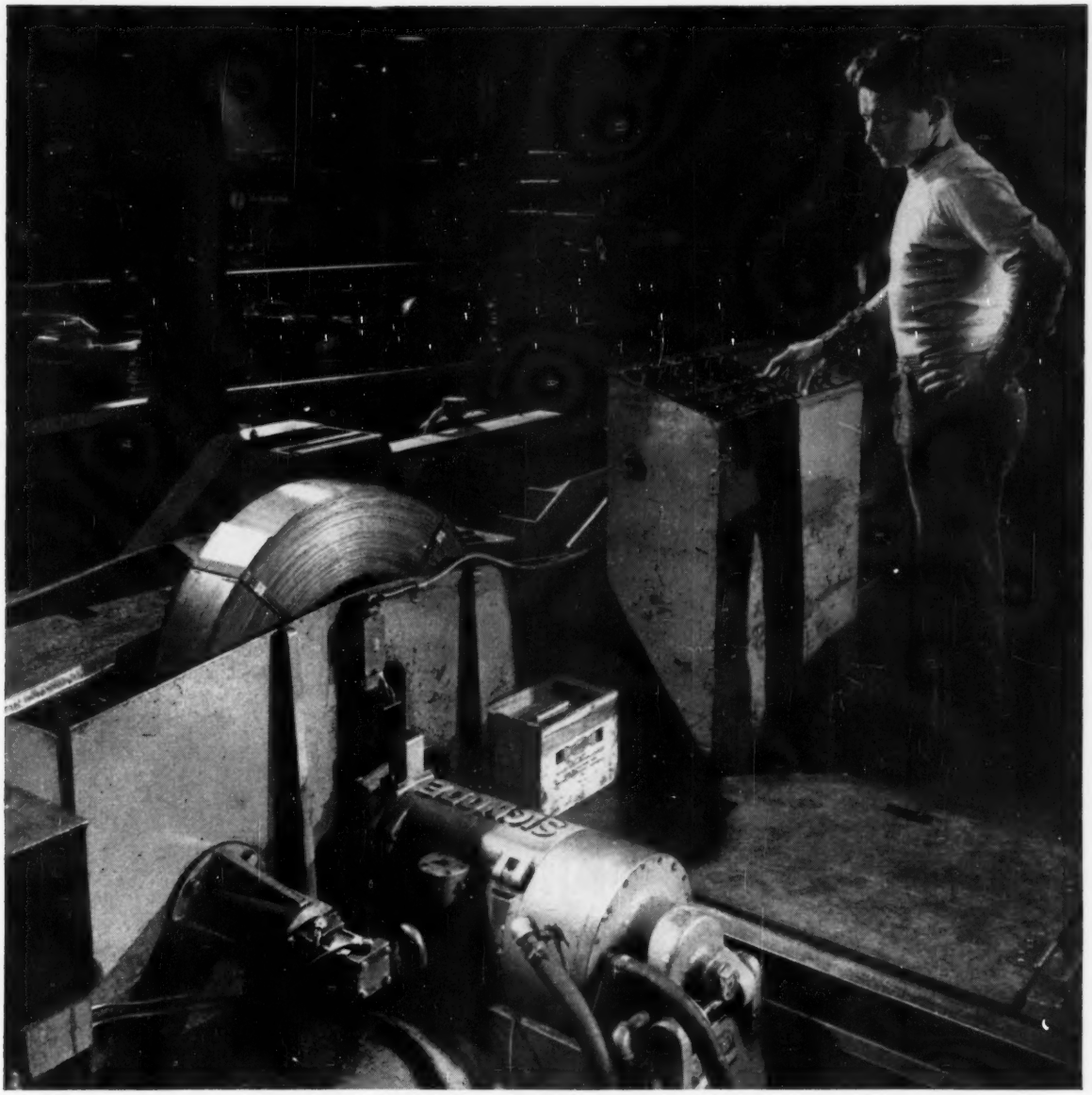

They handle steel . . . with care

This man and Signode's Model MH10 power strapping machine are applying four steel straps to a coil of strip steel. The operator has fast push-button control of strap placement and the strapping action. To position the coil, the machine turns it in the direction that tightens the outer laps. Air-operated plates squeeze the sides of the coil to square it up. Surface finish of the steel is protected. Edges aren't damaged in handling or transit. There's no waste. The coil is worth more, whether it's yours as manufacturer or destined to be yours as receiver. Protection of product integrity to destination is one way Signode makes things cost less to handle, store, ship and receive. For more ways, call the Signode man near you, or write:

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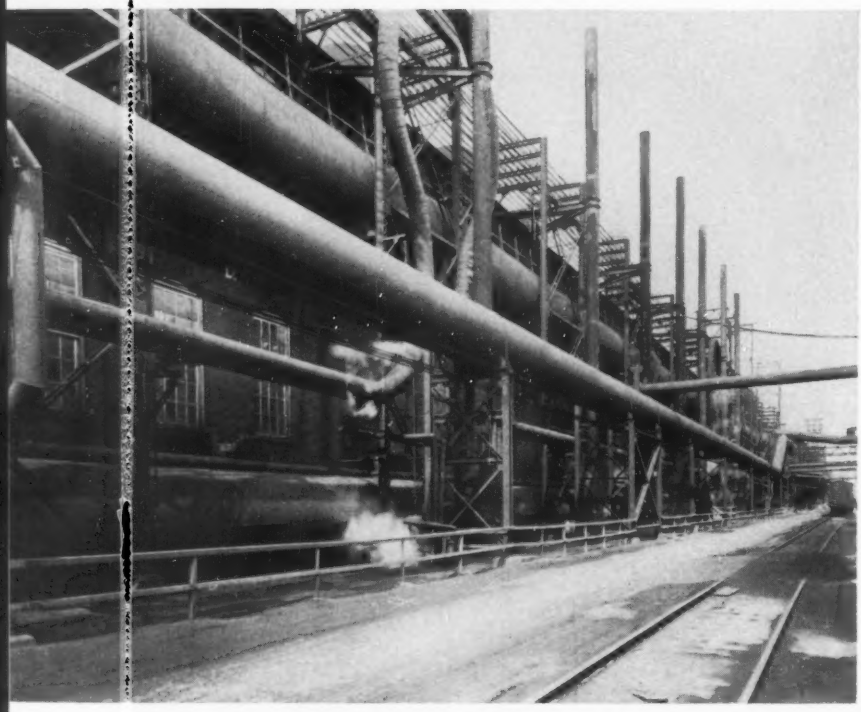
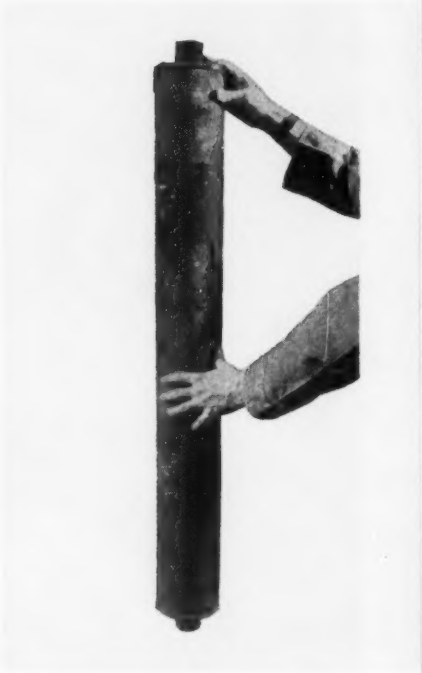


COAL TAR COATING—The cold blast main at a steel company, coated with Koppers Co.'s Bituplastic No. 28 material, is still in excellent shape after six years



ALUMINIZED STEEL—The car muffler at left is carbon steel; it failed in 18 months. Muffler on right is Armco

New Ways To Fight Corrosion

Last week's article discussed developments in cathodic protection, inhibitors, and corrosion resistant materials. This part covers organic and metallic coatings

PART TWO

COATING systems, lacquers, and paints limit the corrosion of metal by isolating it from its environment. They are effective on iron to the extent that they limit diffusion of moisture and oxygen.

In applications where metals are exposed to chemical attack, the inert resin coatings are gaining favor. Most are two-coat systems (primer and finish coats) of the baking or air dry type.

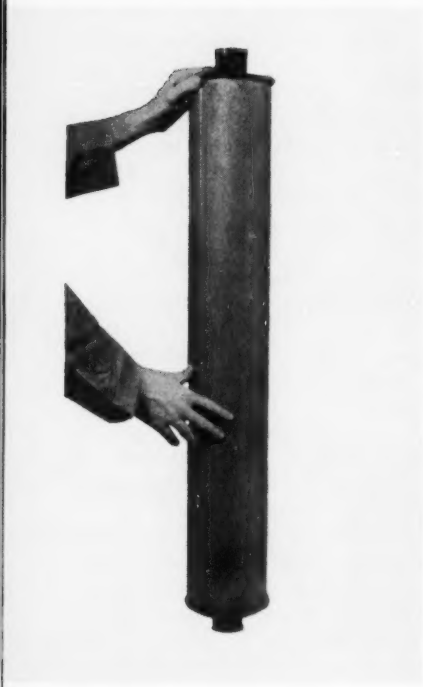
Epoxy Coatings — The epoxy-based coatings are flexible and offer excellent resistance to impact and abrasion. They can be formulated to resist most liquid and gaseous industrial chemicals and are used for drum linings, maintenance finishes, gas and oil pipe lines, and electrical insulation.

Most epoxy formulations include catalyst type curing. There are two kinds: Those with extended pot life that are mixed with the catalyst before spraying; and those that set up almost instantaneously and are put on with a catalyst gun. The epoxy films are relatively thin; it normally takes about six coats to get a 6-mil film thickness.

Vinyl Resins—At normal temperatures, these coatings resist alkalis, mineral acids, alcohols, greases, oils, and aliphatic hydrocarbons. Air drying and baking types can be formulated for good resistance to moisture, high film strength, and good elasticity.

High-build vinyl coatings have been introduced recently. One company claims its coating requires only two coats to exceed the customary minimum safe film thickness of 5 mils when applied at 250 sq ft per gallon over a suitable primer.

Polyurethane Foam—These materials offer good adhesive properties and excellent wear, humidi-



Aluminized Steel, Type 1 (resistant to atmosphere and temperature). It has been in service 55 months

ty and weather resistance. Their insulating properties make them valuable coatings for refinery tanks, pipes, and valves. They can be used clear or pigmented, as a baking or air drying type.

They must be mixed with a catalyst before use. A great deal of success has been had in spraying them with a standard catalyst gun.

Polyurethane Coatings — Their physical properties are a big feature. They are highly flexible and resist impact, abrasion, and chipping.

They are recommended for corrosive acid and alkali service, with a top temperature range of 225 to 250° F.

Synthetic Rubber—Hypalon, a polyethylene polymer, can be formulated with a variety of physical properties. It has excellent resistance to sunlight, weather, heat, ozone, a wide range of industrial chemicals, and flexing—even at low temperatures.

Temperature range is −40 to 350° F. The material often is blended with polyethylene and epoxy resins for greater abrasion resistance.

Paint Primers—Several use a fish-oil vehicle to penetrate rusted surfaces down to bare metal. These materials can be applied directly over rusted surfaces; it is necessary only to remove the loose rust particles. Zinc chromate pigments are used in the primers to inhibit further rusting.

Wash Primers—This protective coating is especially valuable when the quality of top coats is important. Two types: The two package primer and the single package material.

The original wash primer, developed in co-operation with the Bureau of Ships, U. S. Navy, is a two-package system—one containing resin, pigments, and solvents; the other an acid catalyst (phosphoric acid) and additional solvent. In this formulation, the adhesive properties of the mixed primer remaining in the container diminish rapidly after about 8 hours. Its advantages are that it can be applied to yield a 0.1 to 0.3 mil dry film over a great variety of metal surfaces and is effective even under exceptionally humid or wet conditions.

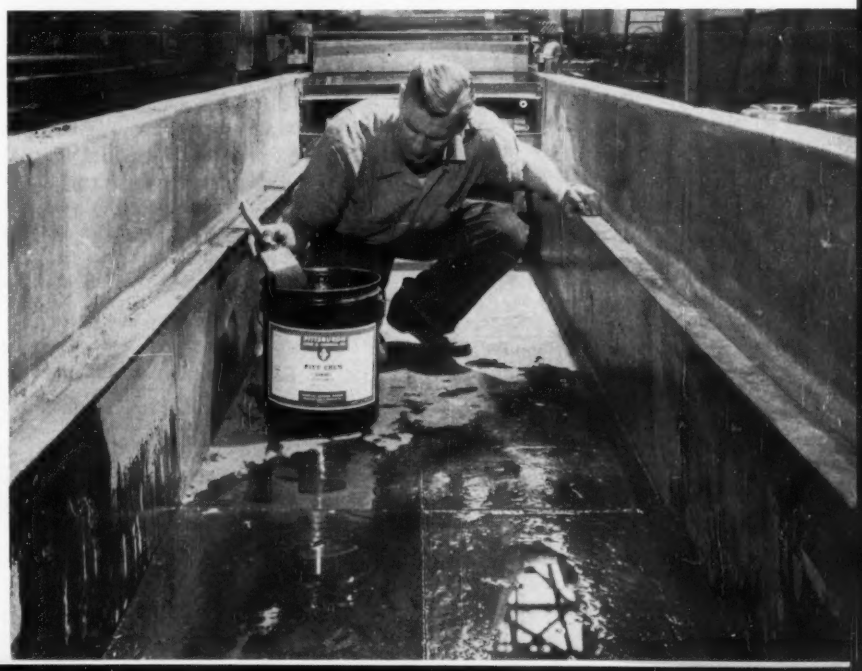
New — Single package wash primers, in which both the base grind (resins, pigments, and solvent) and the catalyst are mixed during manufacture, provide good adhesion and are stable for six months or more. They have most of the desirable features of the two-package system without the limited pot life.

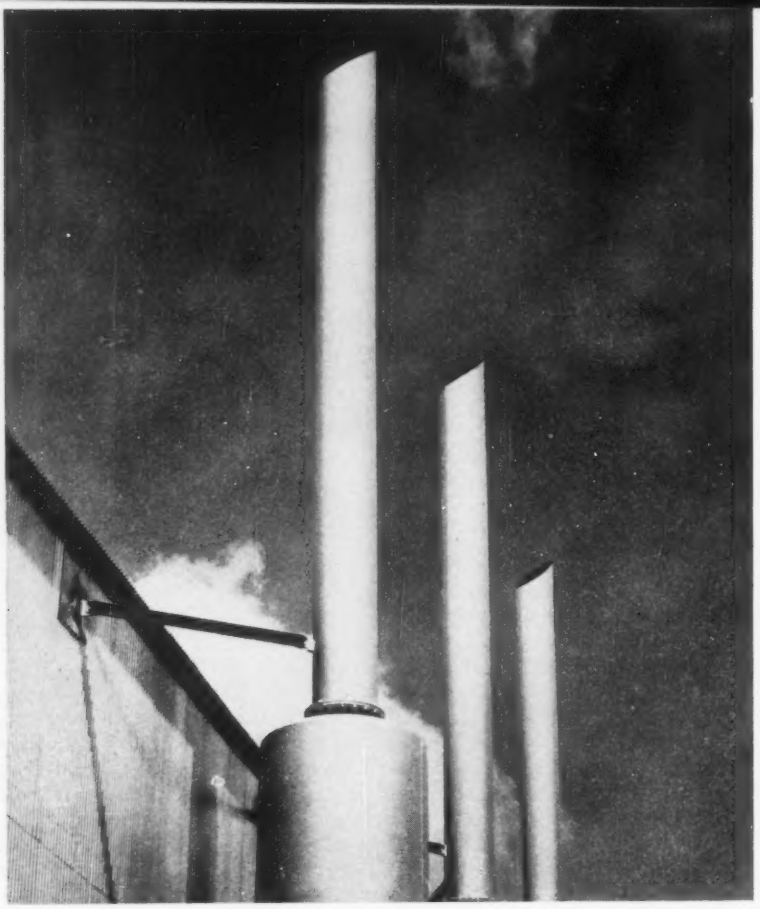
The action of wash primers over steel is threefold: 1. An iron oxide and zinc phosphate film, similar to that formed in the phosphating process, is deposited on the metal. 2. The material provides a continuous supply of chromate ions to repair pin holes in the phosphate film. 3. The need for a special chromate rinse is eliminated. The cured polyvinyl butyral or formal film is chemically bound to the inorganic layers through a chromium complex, providing additional mechanical protection to the metal.

Where They're Used — Refrigerator, washing machine, and other household appliance bodies have been coated with wash primers. Other examples: Auto and truck bodies, oil well equipment, bridges, dam gates, railroad, electrical and communications equipment have given excellent service.

The Navy is a large user of the materials. They are effective on ferrous and nonferrous metals such as steel, aluminum, galvanized iron, magnesium, zinc, nickel, tin,

COAL TAR-EPOXY—A pickling bath tank is coated with Pitt Chem Tarset, a coal tar-epoxy resin catalytic setting coating





SILICONE PAINT—The aluminum pigmented silicone paint on diesel exhaust stacks at the San Patricio reduction plant of Reynolds Metals Co. near Corpus Christi, Tex., is still in excellent condition after 2½-year's service at 950 to 1100° F

cadmium, and copper.

Coal Tar Coatings—These are probably the oldest materials used. Two types: The hot and cold applied. Generally, hot coatings are used to protect underground structures; cold coatings are used on above ground surfaces.

These coatings are primarily moisture barriers. They resist most dilute organic acids and alkalies that are found in soil. They give excellent protection against normal corrosive conditions underground, under water, or in industrial atmospheres.

Epoxy Blend—The newest material is a combined, coal tar pitch, epoxy resin, catalytic setting coating. It is recommended for severe corrosive conditions. Though extremely hard, it is flexible and adheres tightly to metal. It is not easily damaged by bending, handling, or pile driving. You can chip it by hitting it, but you can't break its bond.

The coating is being used in crude oil storage tanks, in refineries where it comes into contact with aviation gas, in mine water piping, in chemical plants, in steel mills, and in marine applications such as barges and piling.

The long life of coal tar coatings (some have been in service since 1914 without damage) is partially due to their thickness. Even a cold application will be 12 to 15 mils thick per coat (two coats usually are put on). Thickness can be particularly important when you have soil movement and changes in temperature above the coated structure.

Silicone Coatings—The big feature of these finishes is their resistance to heat. Silicone-aluminum coatings on jet engine parts have withstood 800° F. The silicones are water repellant and chemically inert, which make them good corrosion resistant finishes.

METALLIC COATINGS

Probably the leading commercial coating of this type is zinc. Over 3 million tons of galvanized sheets and strip were shipped in 1956. Zinc is applied by hot dipping, electroplating, or spraying. The greatest use of zinc coated iron or steel is for applications exposed to the atmosphere.

Zinc-Rich Paints — These coatings contain 80 to 95 per cent zinc by weight. They can be of either the organic or inorganic type, depending on the vehicle or binder used.

Zinc-rich coatings are used for protection of ferrous surfaces exposed to corrosive atmospheres or water. They have been used in touching up galvanized surfaces that have been welded or damaged.

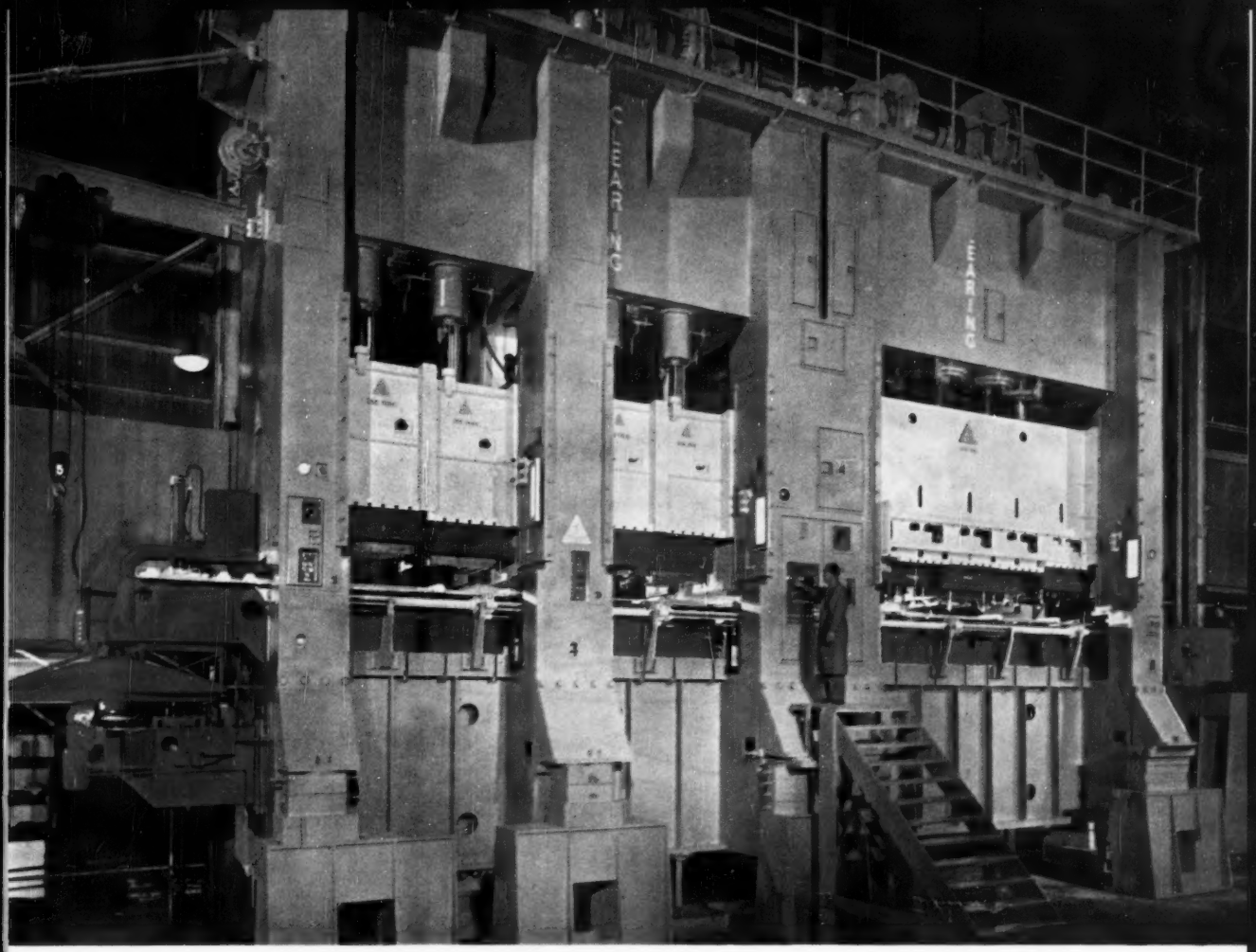
Aluminum Coatings — Hot dip coatings of aluminum on steel are more expensive than zinc but are more resistant to atmospheric corrosion. One type of aluminum coated steel is made primarily for atmospheric protection and is used on such items as folding doors and plant roofing and siding. Service records have shown it can outlast galvanized steel three times.

Another type of aluminum coated steel is made for protection from heat and corrosion. It's being used in such applications as industrial furnaces and auto mufflers.

Chromized Coatings — A diffusion type coating can be produced by heating steel in contact with another metal, such as chromium, in powder, liquid, or gaseous form. This produces an alloy-rich surface layer. Chromized coatings of 4 to 8 mils on steel have corrosion resistance similar to that of high chromium steel. Temperature resistance is better. Such coatings are used on parts requiring resistance to wear, corrosion, and high temperatures.

A new electroplating process for depositing chromium is claimed to give better corrosion protection than standard chromium plate because it is crack-free. Coatings of 0.06 mils or better may be applied directly to steel.

• *An extra copy of this article and Part I which appeared last week are available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



The future of press automation...HERE TODAY!

We call it a Transflex Modular press at Clearing. Transflex means the feed is designed to be readily adjustable to take on parts of varying dimensions and shape. *Modular* means that the press is built on the building block principle. If future requirements change radically, the press can be reassembled along completely different lines—even split up and run as separate units—to provide for these changes. So here is press automation with a long range future. For all practical purposes, obsolescence proof—that's what we mean by the future of press automation.

General Electric will produce two different parts on this machine. They will run one part for a few hours. Adjust the slide and dies. Then run the next part. Needless to say, this one machine does all the stamping operations and can keep well ahead of total requirements for both parts.

A fantastic development? Yes. But this is only one of the many ideas you can find at Clearing for more efficient production of small and large parts. Just ask us about them. We have a lot of things to talk about and a wealth of material to send you. No obligation.

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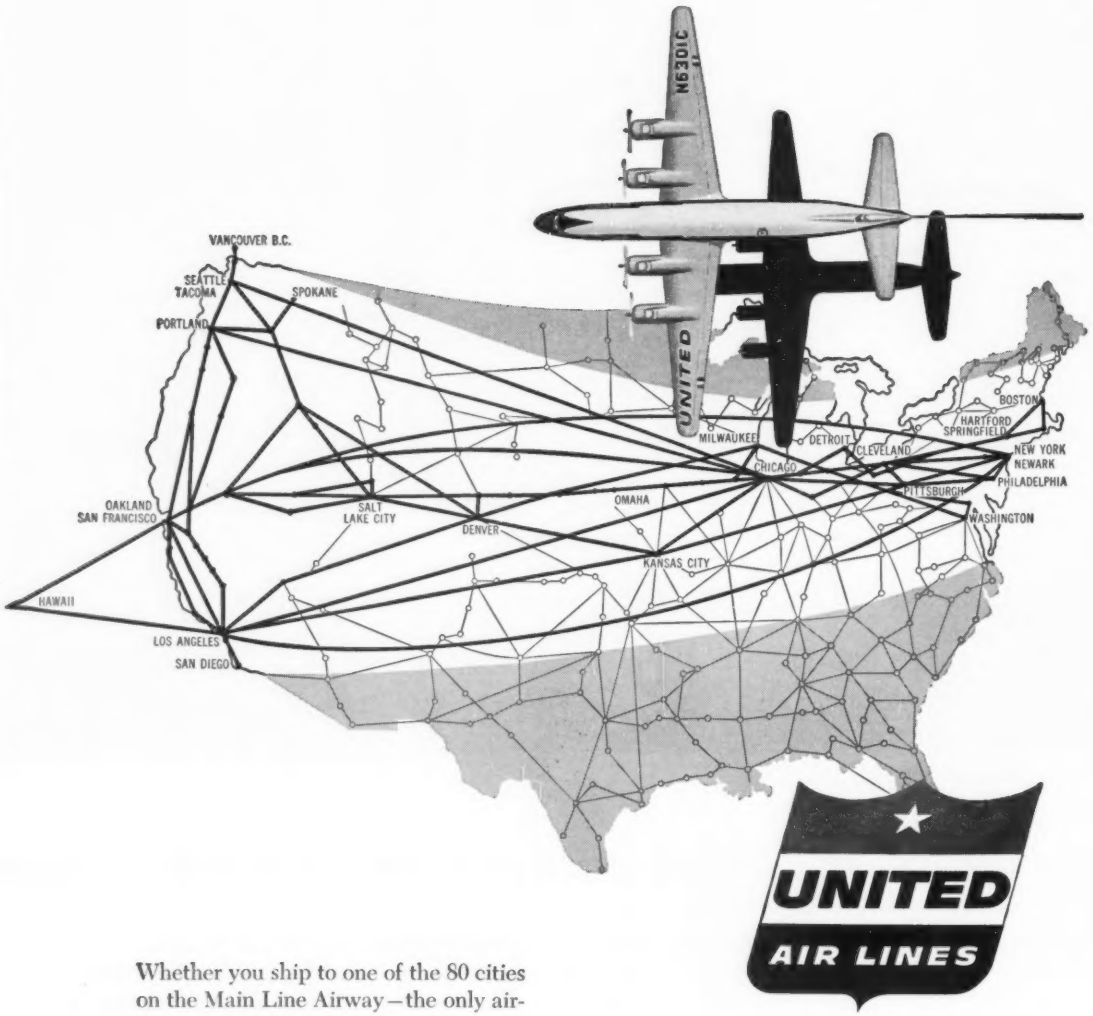

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SHIP FAST . . . SHIP SURE . . . SHIP UNITED

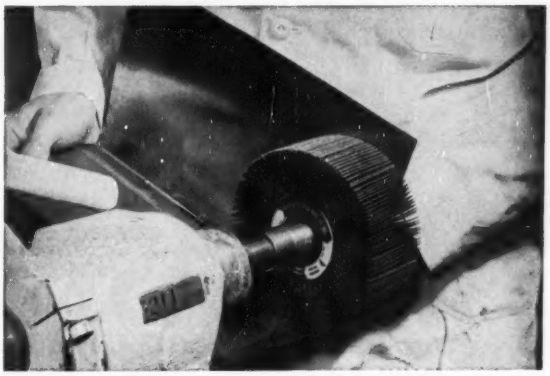
Coated Abrasive Wheels Can Finish in Corners

The line of small PG wheels is used for polishing and grinding.

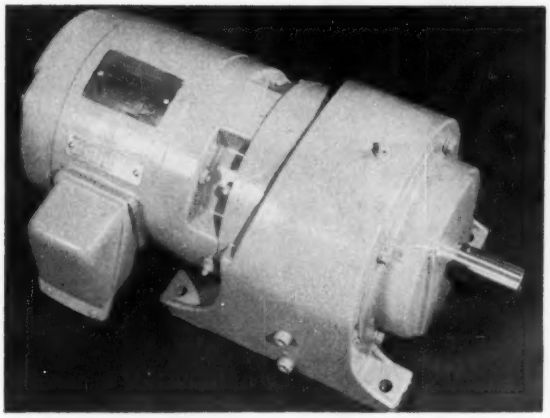
Disposable flanges lock the coated abrasive leaves securely in place. The flanges are bonded to the core and provide hub strength.

Flanges are recessed into the side of the wheel. The end cap nut is also recessed, so that the wheel can be used flush against a surface.

Wheels have diameters of 6 to 10 in. and widths of 1½ in. and up. Adapter kits make it possible to fit the wheels onto any portable tool or bench lathe. *Write*: Dept. F7-268, Minnesota Mining & Mfg. Co., 900 Bush St., St. Paul 6, Minn. *Phone*: Prospect 6-8511



Gear Motors Use Double Helical Gears



This line of integral horsepower motors provides three types of units: An integral unit, an all-motor type which has the drive motor coupled to the gear reducer and mounted on a common carrier, and a separate helical speed reducer which is used with a variety of prime movers.

Mounting dimensions of the three types for similar ratings are identical, and their parts are interchangeable.

Ratio changes are made by changing a pinion and gear in the first stage.

Speed ranges: Single reduction offset shaft, 780 to 350 rpm. Double reduction concentric shaft, 350 to 37 rpm. Triple reduction concentric shaft, 30 to 13.5 rpm. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Gear Shaving and Deburring Are Done Simultaneously

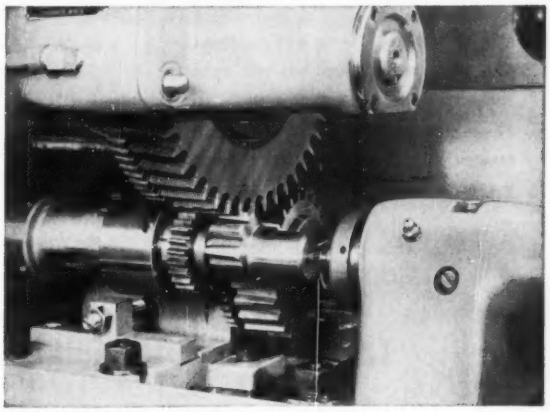
This process enables standard rotary shaving machines to combine gear tooth shaving and outside diameter deburring.

A rotary deburring tool in the form of a gear is used. The tool has a conical involute tooth shape and meshes with the gear segment.

The tooth form at the root of the deburring tool is designed so that the shaving burr at the outside diameter of the gear is removed as it is produced.

The tool is mounted on a spindle at the rear of the shaving machine head and tailstocks.

A train of gears holds the proper timing relationships among the shaving cutter, work-driving head, and deburring tool. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980



NEW PRODUCTS and equipment

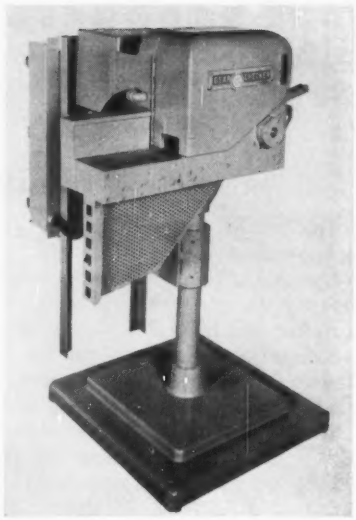
Gear Classifier

Model GRF is an automated electronic machine that sorts gears into size ranges for assembly operations.

True size measurements of spur or helical gears can be made regardless of helix angle variations because a double-pivoted mounting is used for the upper nonrotating master gear.

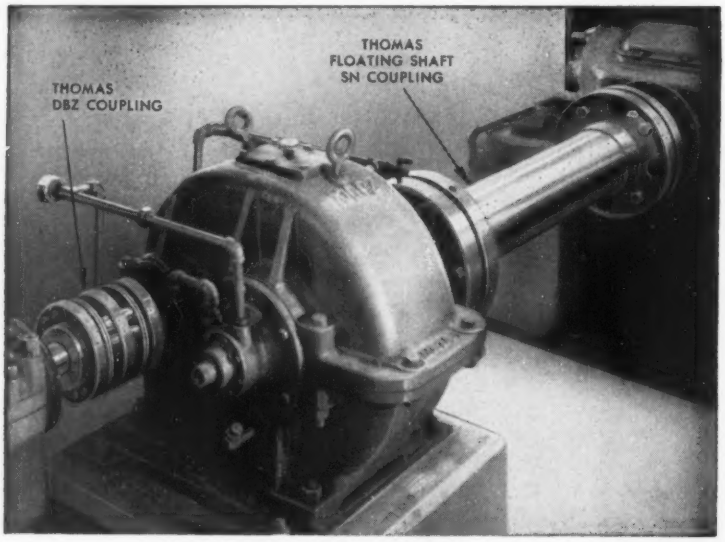
The effect of minute master gear tooth or shaft bearing eccentricities is eliminated by the synchronized engagement of the same tooth of the motor-drive master with each gear being measured.

Center distance movement of the upper master gear as the part being tested moves through is measured by a sensing unit. Electronic controls amplify this signal and cause solenoids to open a door in the exit chute of the classifier which corresponds to the size of the part. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980



THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION NO MAINTENANCE NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

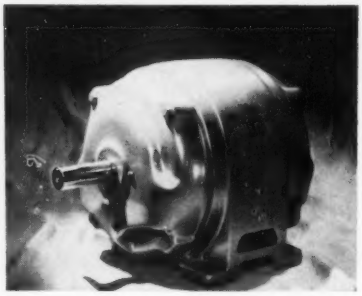
1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Motors

The Uniclosed motor comes in the new NEMA ratings up to 50 hp. The dripproof design provides protection against environmental hazards.



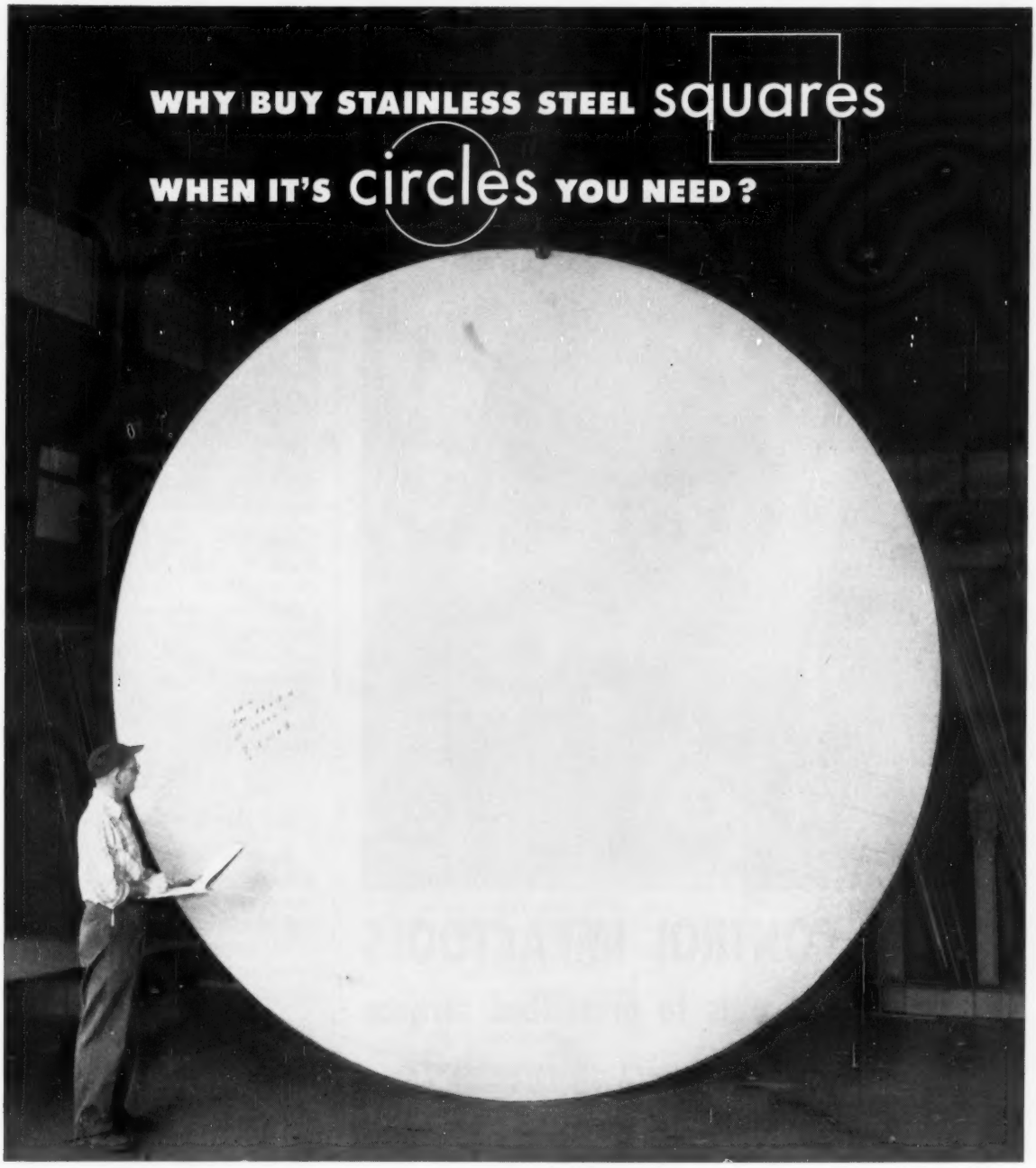
The motor is cooled uniformly by a two-way ventilation system. *Write*: U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif. *Phone*: Richmond 9-9029

Repeating Hammer

Model 300-RH is an air hammer which will repeat 1000 to 2500 times a minute, depending on the air pressure.

On a pressure of 20 psi the hammer will do delicate staking, crimping, and riveting. At 100 psi, it will rivet mild steel $\frac{5}{8}$ in. in diameter.

An air-traverse mechanism controlled by a foot valve lowers the



This circle, 9/16" thick x 164" diameter, is one piece of Type 316L stainless steel. Had the customer ordered a square, he would have paid freight on a half-ton of excess material. Also, he would have had the problem and expense of handling the square and cutting the circle.

Here are four sound reasons why Carlson customers save time and money when they order the circles they want—rather than the squares they have to cut . . .

1. If the gauge and size are circle-shearable, there is no extra charge for cutting the circle. This saves cutting labor and scrap handling expense.
2. If the gauge is such that a cutting charge applies to the square, it pays to order the circle. This eliminates the extra charge for cutting the original square and involves only the one charge for cutting the circle.
3. Because circles weigh approximately 25% less than squares, there's a substantial saving in transportation costs.
4. Small or medium size circles are often available from stock when squares may not be. The delivery time saved can be an important factor.

When you need stainless steel circles, come to Carlson where we specialize in stainless steel . . . that's your guarantee of dependable service.

Stainless Steels Exclusively

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I-R TORSION BAR TORQUE CONTROL

TORQUE CONTROL IMPACTOOLS

consistently run nuts to prescribed torques

I-R Torsion-Bar Impactools now assure top quality control on these 3 operations:

1. *Assembling differential main bearing caps at 450 ft. lbs. both before and after machining as shown above.*
2. *Preloading differential drive pinion bearing with Impactools set at 375 ft. lbs.*
3. *Assembling wheels to wheel hubs at 425 ft. lbs.*

Quality control has risen to a new high for this large manufacturer of farm equipment since I-R Torsion-Bar Torque Control Impactools were installed.

These Impactools are the *only* power wrenches that deliver full power and speed until the preset torque is reached, and then instantly and automatically shut off.

Now, with Torque Control Impactools, the company consistently runs nuts to prescribed torques, saves time, improves quality and eliminates hand torque checking operations.

Write for Bulletin 5170 for proof of how these amazing Impactools can improve quality and cut costs on your own applications.

Ingersoll-Rand

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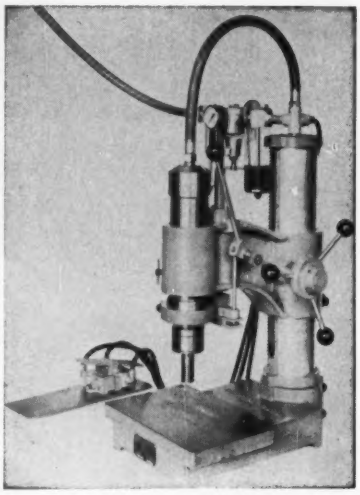
8-524

NEW PRODUCTS and equipment



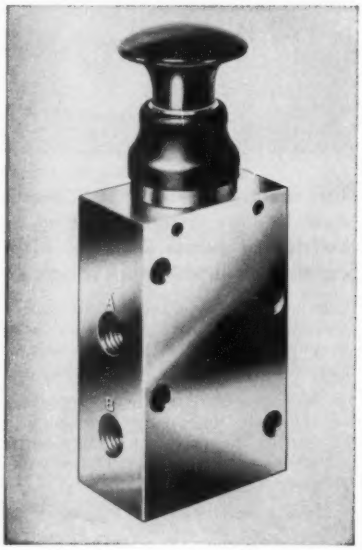
impact tool down to the work and holds it there during the work cycle. Upon release of the foot pedal, the hammer is lifted up from the work.

A depth stop may be set to limit the work progress. *Write*: Heidrich-Nourse Co., 631 E. Third St., Los Angeles 13, Calif. *Phone*: Mutual 2873

Pilot Air Valve

A small synthetic rubber boot snaps around the stem of this control valve to protect it from dirt and abrasives.

The valve is built for 150-psi air operation and has ¼-in. pipe ports. The valve can be base, panel, or

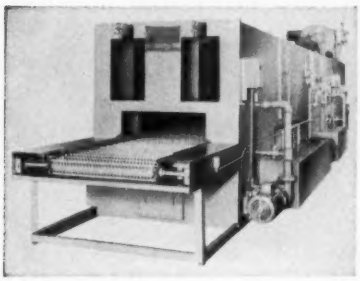


wall mounted. It can be used as a two or threeway valve. *Write*: Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill. *Phone*: Brunswick 8-2710

Washing Machine

The Triple Tunnel does the work of three separate washers in a single housing. Two overhead conveyers and a flat wire mesh belt conveyer pass through the machine.

Parts are placed on the appropriate overhead conveyer on the basis of later operations. The flat, wire-mesh belt handles parts (including machined ones) which cannot be cleaned and dried effectively when suspended from an overhead conveyer.



The three conveyers can be operated simultaneously or individually. All three lines use common solution tanks and a common spray system.

The wash-rinse-dry cycle is automatically timed. *Write*: Alvey-Ferguson Co., 1986 Disney St., Cincinnati 9, Ohio. *Phone*: Redwood 1-7000

Automatic Maching and Assembly Unit

The Economatic incorporates assembly with machining operations. It produces 489 steering gear parts an hour.

Operations performed: Spot drill for countersink, drill through for ream, end cut ream to straighten hole, size ream for close hole tolerance, and press in pin.

A gripping device unites the work-holding fixture and assembly unit into an integral mechanism. Individual hydraulic cylinders are

small, lightweight air hoist gives you greater VERSATILITY

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AIR-BLOC combines safety, ruggedness and mobility...

Move it anywhere . . . hang it anywhere . . . the I-R AIR-BLOC gives you versatility you never thought possible for speedy handling of loads up to 1000 pounds. No mechanical brake to fail . . . load can't drop even if air pressure fails. Responsive throttle control and automatic up-down-stop permit extremely accurate handling. There's a size just right for your job.

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- Speeds spotting of loads.
- Provides "Finger-tip" control over full range of speeds.

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AIR HOISTS up to 24,000 lbs.

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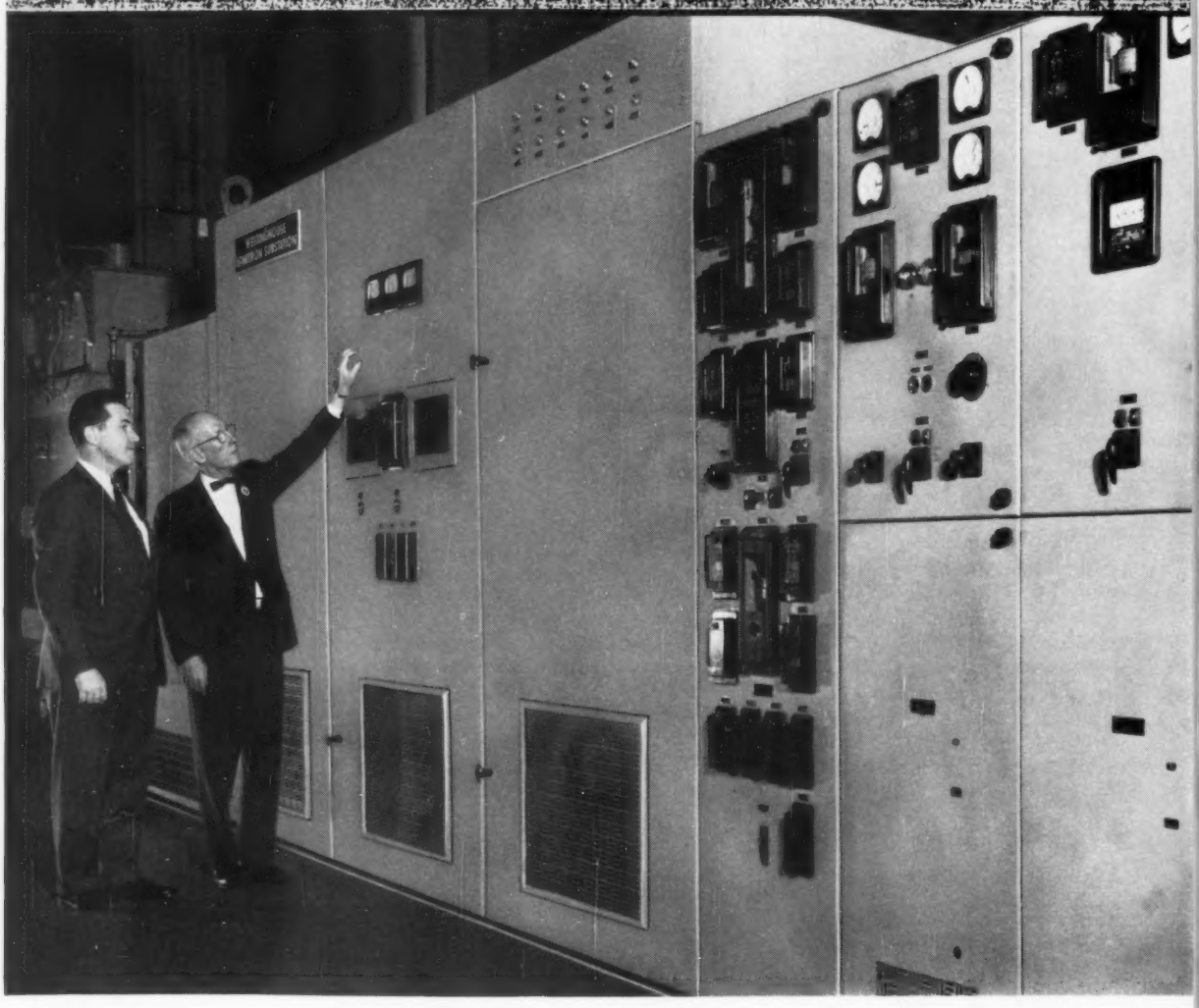
for dependable DC power...plus

Steel mill lists 7 "musts" for a rectifier...



orders Westinghouse Ignitron

BEFORE MAKING A DECISION on the purchase of a rectifier, the chief electrical engineer of a large Eastern steel mill jotted down 7 "musts". His search for the ideal steel mill rectifier soon ended, for he found that the Westinghouse Ignitron met all of his requirements:

LOW INSTALLATION COST Simply interconnect the adjacent metal cubicles which are pre-wired.

SMALL FLOOR SPACE The Ignitron assembly and auxiliary equipment are contained in compact cubicles which are close-coupled.

NO SPECIAL FOUNDATION Any reasonably level floor of normal strength will do.

SAFE Grounded dead-front metal enclosure permits safe location in any available space. No need for fencing or insulated floors.

LOW MAINTENANCE Principle of operation permits simple design . . . no major moving parts.

HIGH OVERLOAD CAPACITY Momentary overloads and short circuits won't damage the Westinghouse Ignitron.

LOW OPERATING COST High efficiency . . . low arc-drop loss. Simple automatic operation . . . freedom from problems of high starting demand and synchronization.

Ignitron Rectifiers were invented by Westinghouse and over 5,000,000 kilowatts have been supplied to satisfied users in industry. For the type — pumped or sealed — best suited for your needs, call your Westinghouse sales representative or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J-15002

YOU CAN BE SURE... IF IT'S Westinghouse

Tubular's model 81
the Versatile riveter

- **AUTOMATICALLY** feeds and sets any style of **TUBULAR'S** rivets up to 16/16″ long x 9/64″ diam. heavy setting or 3/16″diam. light setting.
- can permanently fasten **HUNDREDS** of different products.
- precision automatic setting to **SAVE** you hours of fastening **TIME** and **LABOR.**

Fastening "the *Tubular* Way" — with a Model 81 single head automatic riveter will equip your production line with the most versatile of riveting machines.

- Motorized or pneumatic operation.
- Has 10″ throat.
- Anvil Arm or Horn Adjustment of 19″.
- Rivet-setting speed limited only by speed of operator.
- Single revolution clutch eliminates repeat settings, prevents damage to your products.
- Accessories include dial tables, loop anvils, etc. for more economical fastening.

For further information on this Model 81 or Tubular's other automatic riveting machines, write direct or call your nearest Tubular Branch Office.

A FEW OF THE PRODUCTS PERMANENTLY and AUTOMATICALLY FASTENED ON TUBULAR'S MODEL 81 RIVETER

Step Ladders	Suitcases	Appliance Covers	Theatre Seats
Elec. Sockets	Sleds	Windshield Wipers	Radio Relays
Fans	Ball Bearing Holders	Stove Pipes	Tape Measures
Auto Window Frames	Paint Roller Trays	Safety Helmets	Deep Freeze Boxes
Terminal Boxes	Vacuum Cleaners	Baby Carriages	Condenser Cans
Folding Chairs	Pot Cover Handles	Storm Windows	Muffler Holders
Elec. Switches	Missile Parts	Loose Leaf Binders	Eye Glasses
Bearing Housings	Typewriter Arms	Sample Cases	Chimes Brackets
Air Vents	TV Chassis	Toys	Cameras
Auto Window Vents	Percolators	Handbags	Toasters
Golf Bag Handles	Refrig. Trays	Chicken Feeders	Staplers

Tubular Rivet & STUD COMPANY
WOLLASTON (QUINCY) 70, MASS.

FASTEN AUTOMATICALLY BETTER and FASTER with TUBULAR'S RIVETS and MACHINES

MIDWEST OFFICE & WAREHOUSE — CHICAGO

BRANCH OFFICES: BUFFALO • CHARLOTTE • DALLAS • DETROIT • INDIANAPOLIS
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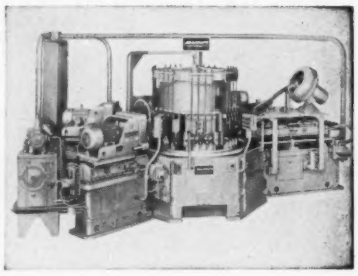
See your local classified directory for phone numbers

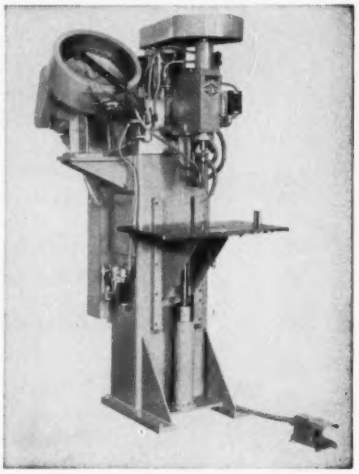
NEW PRODUCTS and equipment



used to press each pin and maintain the close tolerance required in subassembly. *Write*: Buhr Machine Tool Co., Ann Arbor, Mich. *Phone*: Normandy 2-5646

Machine Drives Studs

Model STD-1 can produce up to 630 in. lb of driving torque. The heavy duty unit will drive standard studs up to ⅝ in. diameter, Schweppe self-tapping studs, and Tap-Lok inserts. Either single or multiple spindle units are available.



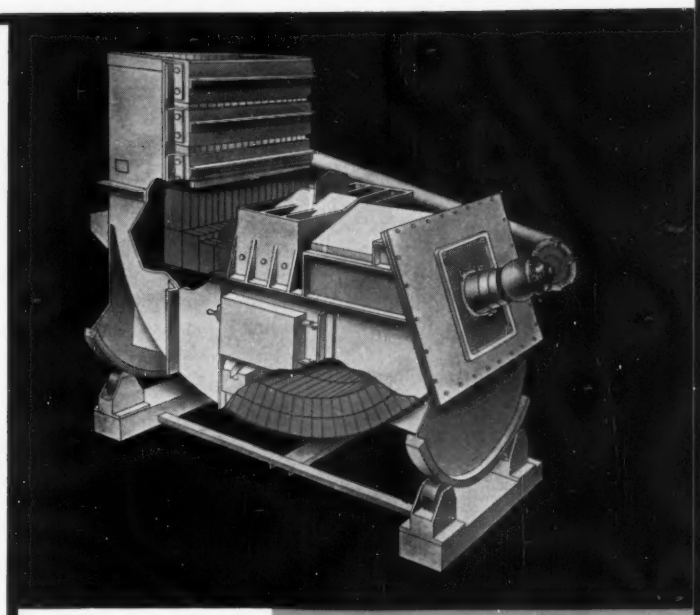
Up to 1000 cycles can be made in an hour. Studs are automatically fed by a hopper. *Write*: Gray Equipment Co., 13600 Ford Rd., Dearborn, Mich. *Phone*: Tiffany 6-7573

Spring Tester

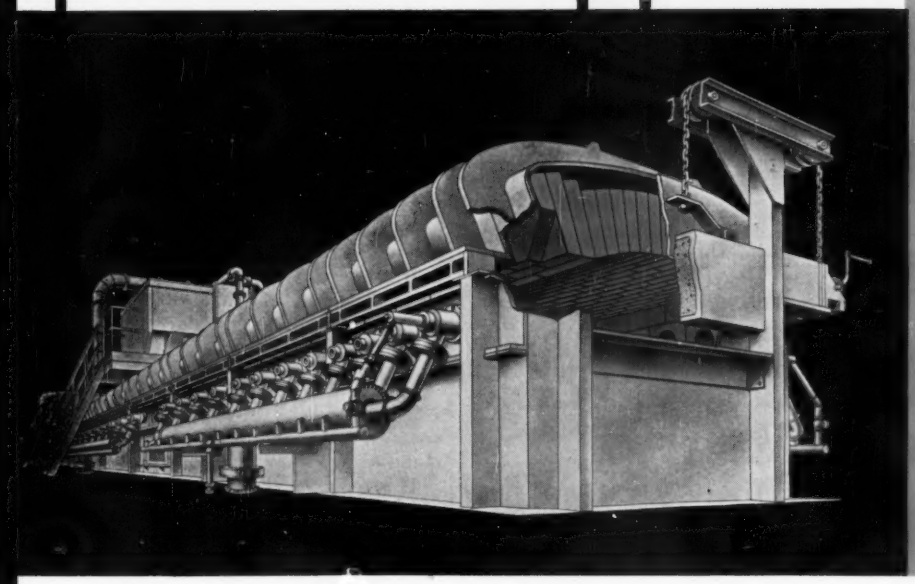
Model 9042 is an electronic unit that can test up to 900 automobile springs an hour. It classifies them into four acceptable zones, an overzone, and an underzone.

The spring is placed on a ver-

Why B&W Allmul Firebrick withstand punishing service in furnaces like these



▲ Direct-fired reverberatory furnace for melting brass, aluminum, and iron. For longer refractory life, B&W Allmul Firebrick are used to line the bath and arch.



◀ In this type of furnace for continuous high speed heating of strip for welding into pipe, temperatures in excess of 3000 F are common and the atmosphere is contaminated with iron oxide. Because of their resistance to spalling and metal penetration, B&W Allmul Firebrick have set new standards for refractory life in bungs, burner blocks and recuperators.

B&W Allmul Firebrick stand up under extremely high temperatures at continued high rates of operation because they are produced from electrically melted mullite grain by a highly efficient process. These top-quality brick have high hot-load strength, high resistance to spalling, good volume stability and a melting point of 3335 F.

They are practical from a cost standpoint for a wide range of applications in the ferrous and non-ferrous metal industries. Illustrated on this page are a butt-weld furnace as well as a direct-fired reverberatory furnace. Other services are direct and indirect-arc electric furnaces, air furnaces, furnace hearths subject to iron oxide scale attack, crucible melting units and furnaces melting many non-ferrous metals and alloys.

Your B&W representative can show you how B&W Allmul can lower your refractory costs in many heavy-duty services. Consult him or write for Bulletin R-34A, giving data on B&W Firebrick for exacting services.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

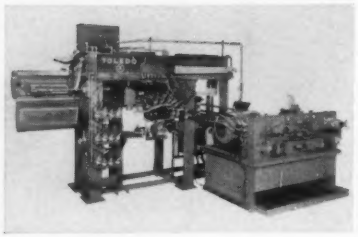
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

tical turntable which moves it to the bulldozing station where the initial stress is set up.

At the test station, it is compressed a predetermined distance. A dynamic, weighing-type indicating mechanism transmits signals to an electronic counter which in turn controls the color coding equipment.

At the color coding station, paint



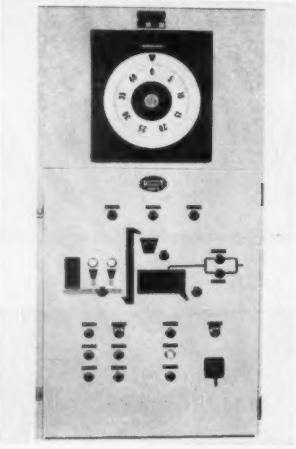
indicates that the spring belongs to one of the four acceptable ranges or is too weak.

Springs that are too strong are left unpainted so that they may be run again. *Write*: Toledo Scale Co., Toledo, Ohio. *Phone*: Kingwood 5441

Tempers Sand

Model 3917 adds the proper amount of water to each batch of molding sand automatically. It also automatically cycles each stage of the mixing operation.

Moisture is measured continuously during the mixing cycle. Moisture content can be changed at any time by turning a knob.



Batch sizes can vary as much as 25 per cent. *Write*: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich. *Phone*: Webster 3-9790

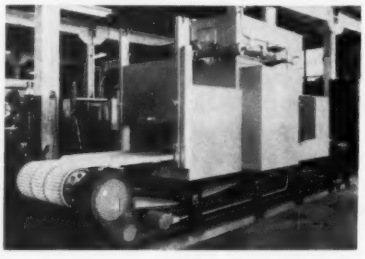
Automated Oven

A conveyer belt carries the product through the heating zone. Loading and unloading can be made automatic.

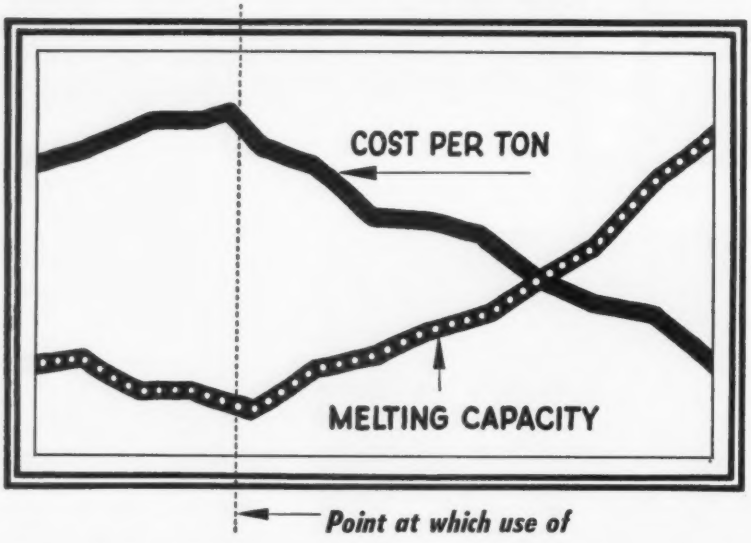
The oven is gas fired, has a 1-million-Btu burner, and its maximum temperature is 450° F. Uses: drying and baking processes, dehydrating, and baking on finishes.

The continuous belt is 36 in. wide. Its speed can be adjusted from 2 to 10 ft per minute.

The baking chamber is 38 in.



A Great Picture By GLOBE Ladle Brick



Point at which use of

GLOBE SUPERIOR LADLE BRICK

was introduced . . . . . .

When Globe superior ladle brick is specified, cost per ton goes down and melting capacity goes up. These happy conditions come about due to the fact that Globe ladle brick last longer on account of their greater resistance to Open Hearth slags. Globe superior ladle brick are well known in the Steel Industry. There is a type for every need of ladle lining. Our customers have learned to depend on both quality and service that the brick and our Company render.

SERVING THE STEEL INDUSTRY SINCE 1873 ★

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

wide, 24 in. high, and 15 ft long. Counterbalanced doors at each end are adjustable. *Write*: Grieve-Hendry Co. Inc., 1401 W. Carroll Ave., Chicago 7, Ill. *Phone*: Taylor 9-0200

Acid Inhibitor

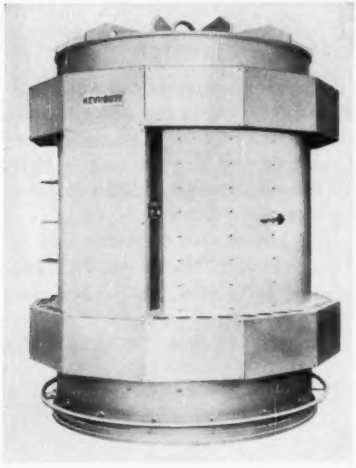
Acid Inhibitor 11 can be used on high carbon steel without danger of etching. It can be used in concentrations of about 0.2 per cent by volume.

The inhibitor can be added to cold or hot sulfuric or muriatic acids or to other nonoxidizing acids, such as phosphoric, hydrofluoric, oxalic, and citric.

The inhibitor has no odor and does not produce a foam on the acid solution. Acid stable wetting agents may be added when a foam is desired. *Write*: Enthone Inc., 442 Elm St., New Haven, Conn. *Phone*: Spruce 7-5581

Vacuum Furnace

Titanium, zirconium, stainless steel, and other materials are hardened and annealed, brazed, sintered, degassed, or soldered in these vacuum furnaces.



Double pump, pit, or bell models operate at temperatures up to 2100° F. Single pump vacuum retorts are used where temperatures do not exceed 1600° F. *Write*: Hevi-Duty Electric Co., Milwaukee 1, Wis. *Phone*: West 3-2756

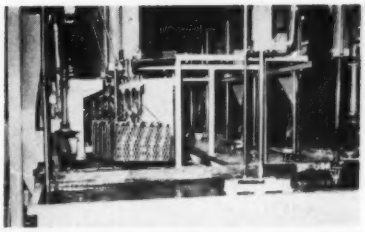
Dip Processing

This machine indexes automatically for multistage finishing operations.

It dips baskets of parts in a series of tanks as the baskets travel suspended from a single, closed-loop monorail conveyer.

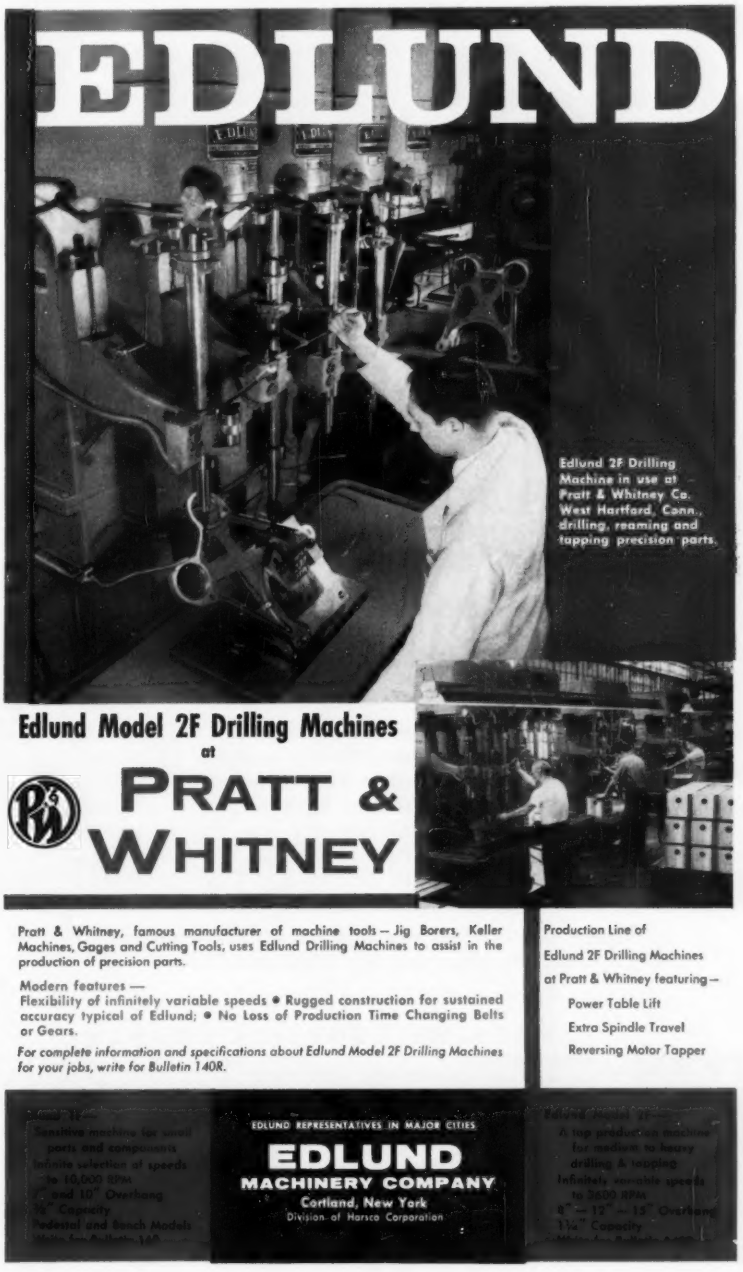
The tanks are only long enough to permit entry and processing of parts.

As the conveyer indexes in transit, the baskets of parts are



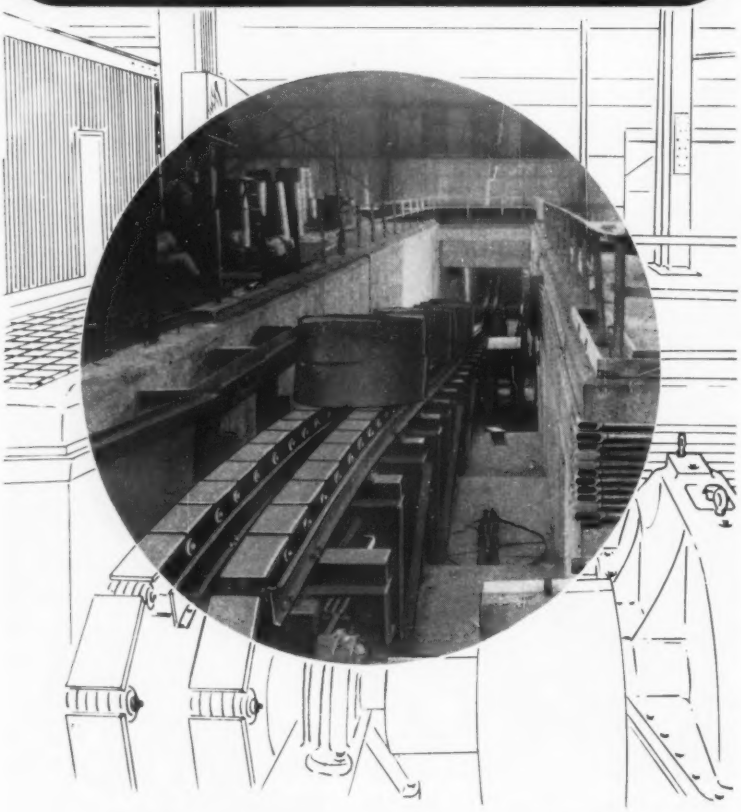
the conveyer again indexes, the baskets are raised and positioned for the next cycle.

The indexing is actuated by a floating cam which operates air cylinders spaced throughout the


EDLUND
Edlund 2F Drilling Machine in use at Pratt & Whitney Co. West Hartford, Conn., drilling, reaming and tapping precision parts.
Edlund Model 2F Drilling Machines
at
PRATT & WHITNEY
Pratt & Whitney, famous manufacturer of machine tools — Jig Borers, Keller Machines, Gages and Cutting Tools, uses Edlund Drilling Machines to assist in the production of precision parts.
Modern features —
Flexibility of infinitely variable speeds • Rugged construction for sustained accuracy typical of Edlund; • No Loss of Production Time Changing Belts or Gears.
For complete information and specifications about Edlund Model 2F Drilling Machines for your jobs, write for Bulletin 140R.
Production Line of
Edlund 2F Drilling Machines
at Pratt & Whitney featuring —
Power Table Lift
Extra Spindle Travel
Reversing Motor Tapper
EDLUND REPRESENTATIVES IN MAJOR CITIES
EDLUND
MACHINERY COMPANY
Cortland, New York
Division of Harsco Corporation

MATHEWS

Engineers and Builders of Conveyers and Conveyer Systems for the Metalworking Industries



Mathews engineers have been working with conveying problems in the metalworking industries for better than 50 years. In this time they have developed outstanding systems of gravity and power conveyers and special conveying machinery for handling coils, sheets, slabs, and bars—through all stages of processing. They know what severe service is, and design equipment accordingly.

That's why—when you buy heavy-duty conveyers—you get the best when you buy Mathews.

MATHEWS CONVEYER COMPANY

GENERAL OFFICES . . . . . ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIV. . . . MATHEWS CONVEYER COMPANY WEST COAST, SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . MATHEWS CONVEYER COMPANY, LTD., PORT HOPE, ONTARIO.

MATHEWS

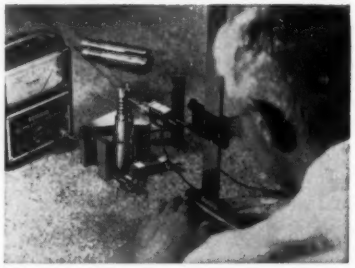
Fifty Years of Leadership in Mechanized Handling

NEW PRODUCTS and equipment

length of the conveyer system. *Write*: Cincinnati Cleaning & Finishing Machinery Co., Hagemen Street, Cincinnati 4, Ohio. *Phone*: Princeton 1-5100

Gaging System

The Electro-Probe is a hermetically sealed gage head that can be used with different types of contacts and contact mountings. It is operated with any one of several types of amplifiers.



The amplitude of the electronic signal (continuously produced) maintains an exact relationship to contact movement.

Linear output is available over 0.060 in. of contact travel.

Sensitivity of the gage is said to exceed precision gaging requirements. *Write*: Federal Products Corp., 1144 Eddy St., Providence 1, R. I. *Phone*: Stuart 1-9300

Conveyer Switch

This three-way switch automatically sorts packages according to size, weight, or classification. Packages can be sent to the right or left or straight ahead without the use of deflectors.

The switch can be controlled by remote pushbuttons, limit switches, photoelectric cells, and other electrical means.

Limit switches automatically

OHIO SEAMLESS TUBING

SPEEDS UP DRILLING 25%

Pennsylvania Drilling Company, Pittsburgh, manufactures drilling equipment for foundation testing, mineral prospecting and other drilling, boring and sampling operations. Recently they introduced a new Flush-Joint Drive Casing made from cold drawn OSTUCO Seamless Steel Tubing.

The new casing stepped up overall drilling progress 25%—driving and pulling is easier and quicker. Flush-Joint Casings are stronger, too—actually 50% less breakage . . . with resultant savings in downtime, repair and material costs. Success with the new casing led to its incorporation in Penndrill's newly-designed Testborer which augers, automatically samples and drives and core drills.

There's a good chance OSTUCO Tubing components can improve the performance of your product. You can start the process by contacting the nearest Ohio Seamless sales office, or by writing direct to the Shelby factory.

OSTUCO SHELBY, OHIO

OSTUCO TUBING

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EXCLUSIVELY BY

OHIO SEAMLESS TUBE DIVISION

OF COPPERWELD STEEL COMPANY

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CANADA: Railway & Power Engr. Corp., Ltd.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY, 225 Broadway, New York 7, New York

NEW PRODUCTS and equipment

classify by package heights. Scale controls divert underweight and overweight packages while those that pass inspection pass straight through.

A series of classifications can be made to bring like packages into the proper storage line.

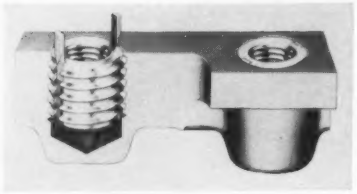
Conveyer widths: 12, 15, 18, and 24 in. *Write*: E. W. Buschman Co., Clifton and Spring Grove Ave. Cincinnati 32, Ohio. *Phone*: Mulberry 1-1600

Threaded Insert

Keensert is a self-locking threaded insert that provides a strong internal thread for bolt attachment in soft materials, such as aluminum and magnesium alloys and plastics.

It is also installed in harder metals to provide a self-locking internal thread in a blind hole.

The inserts can be screwed into tapped holes by hand. Pullout resistance is provided by external



threads along the unit's entire length.

The internal thread, self locking arrangement grips the bolt after about one bolt diameter of thread engagement. *Write*: Newton Insert Co., 6500 Avalon Blvd., Los Angeles 3, Calif. *Phone*: Pleasant 2-4157

Enameling Furnace

These furnace units are adapted to the low-temperature (1000° F) enamels used on aluminum, aluminized steel, and stainless steel.

Heat losses are minimized by lining the shells with insulating brick and block.

The furnaces come with or without forced convection in gas-fired radiant tube or electric models.

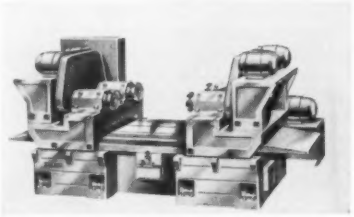
There are two sizes. Each is 2 ft wide and 4 ft high. One furnace is 6 ft long; the other, 12 ft. Both units may be joined end-to-end to make longer furnaces. *Write*: Furnace Engineering Div., Ferro Corp., 4150 E. 56th St., Cleveland 5, Ohio. *Phone*: Michigan 1-8580

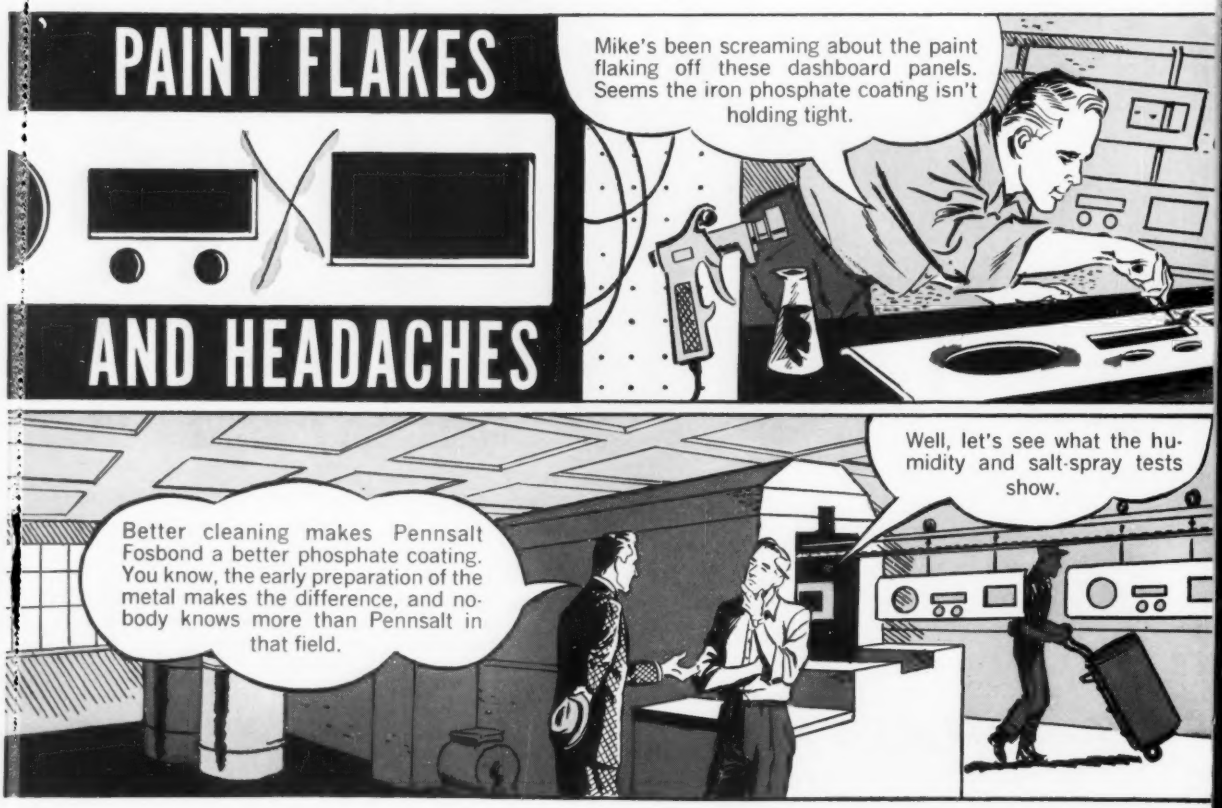
Borers Are Big

Precision boring, turning, facing, grooving, and chamfering are done by two large boring machines.

The double-end model, 2440, has two bridges that support the spindles and their drive equipment. Several spindles can be mounted on the bridges which are 54 in. wide.

Maximum length of the table




PAINT FLAKES
AND HEADACHES
Mike's been screaming about the paint flaking off these dashboard panels. Seems the iron phosphate coating isn't holding tight.
Better cleaning makes Pennsalt Fosbond a better phosphate coating. You know, the early preparation of the metal makes the difference, and nobody knows more than Pennsalt in that field.
Well, let's see what the humidity and salt-spray tests show.

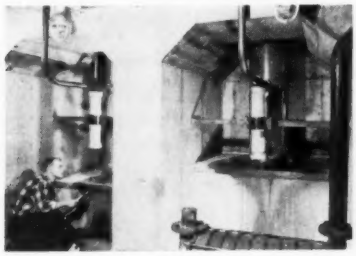
NEW PRODUCTS and equipment

stroke is 40. Table fixture pads are 28 x 46 in.

The single-end model, 1440, is identical to the 2440 except that it has only one bridge, mounted on the lefthand end. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Hydraulic Accumulators

This line of piston-type accumulators can be mounted in any position. There are 14 models with oil capacities from 10 cu in. to 10 gallons, and four inside diameter sizes ranging from 2 to 7 in.



The accumulators are used for shock absorption in addition to functioning as auxiliary or emergency sources of hydraulic power. *Write*: Industrial Hydraulics Div., Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. *Phone*: Kenmore 1-3000

Cutting Oil

Gulfcut heavy duty soluble oil combines the cooling ability of water with the lubricity and protection of oil.

The emulsified cutting oil includes chemically active compounds to protect against foaming and welding.

The average mixture is 25 parts water, 1 part oil.

Uses include heavy hogging cuts, fast fine cuts, boring, and grinding of ferrous and nonferrous metals and alloys, including titanium alloys.

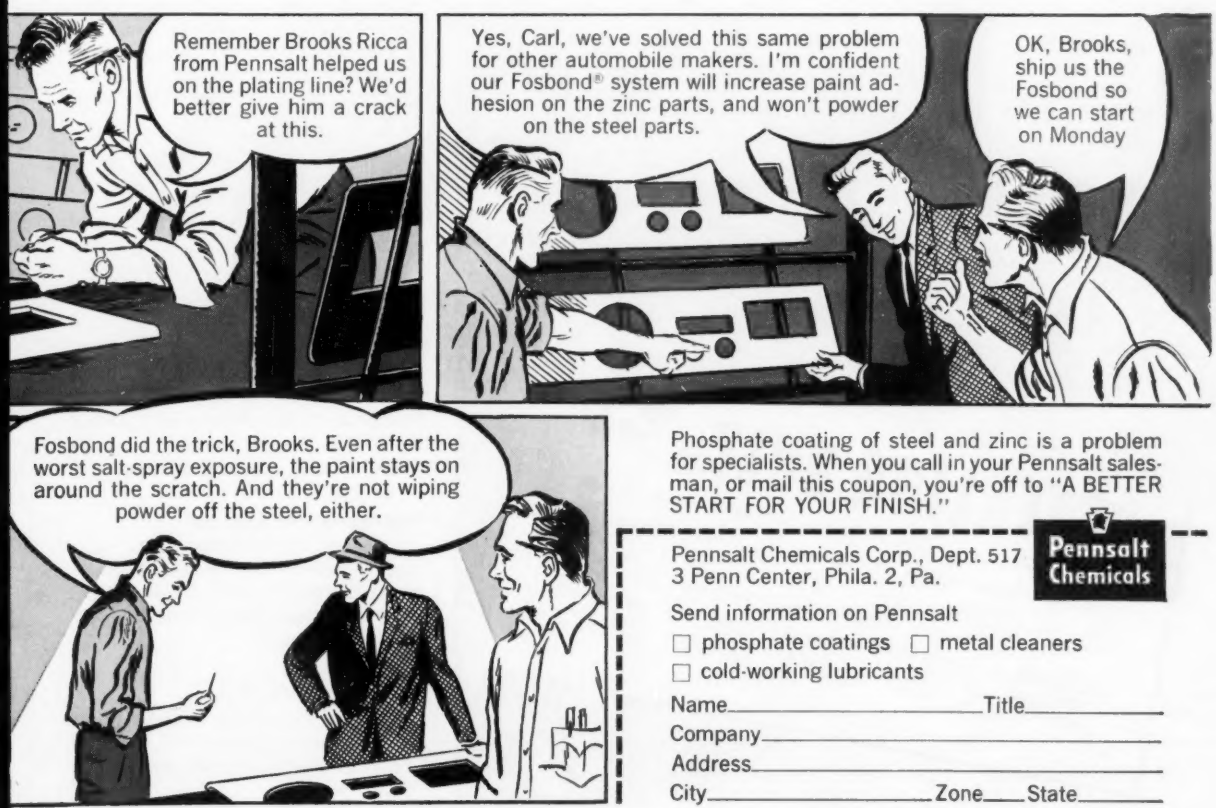
The oil is particularly good for metals with low machinability ratings. *Write*: Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa. *Phone*: Express 1-2400

Ultrasonic Cleaning

This generator, Sonogen Model AP-25-B, is used with tank-type or stainless steel immersible transducers. It is used for cleaning antifriction bearings and other small parts that must be dirt-free before assembly.

For cleaning-rinsing and other two-step operations, the generator output can be switched between transducers mounted in separate tanks.

Peak power on pulses is 500 watts; average power, 125. *Write*: Branson Ultrasonic Corp., 40 Brown House Rd., Stamford, Conn. *Phone*: Davis 4-6721


Remember Brooks Ricca from Pennsalt helped us on the plating line? We'd better give him a crack at this.
Yes, Carl, we've solved this same problem for other automobile makers. I'm confident our Fosbond® system will increase paint adhesion on the zinc parts, and won't powder on the steel parts.
OK, Brooks, ship us the Fosbond so we can start on Monday
Fosbond did the trick, Brooks. Even after the worst salt-spray exposure, the paint stays on around the scratch. And they're not wiping powder off the steel, either.

Phosphate coating of steel and zinc is a problem for specialists. When you call in your Pennsalt salesman, or mail this coupon, you're off to "A BETTER START FOR YOUR FINISH."

Pennsalt Chemicals

Pennsalt Chemicals Corp., Dept. 517
3 Penn Center, Phila. 2, Pa.

Send information on Pennsalt

☐ phosphate coatings ☐ metal cleaners
☐ cold-working lubricants

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Gulf Coast Bolt & Nut Co. 1115 Silver St., Houston 10, Tex.
Texokana Bolt & Nut Co 1810 S. Akard St., Dallas 15, Tex.
Penn Bolt & Nut Co P.O. Box 9967, Pittsburgh 33, Pa.
BOLTS

NEW literature

Write directly to the company for a copy

Car Shaker

Bulletin 07B7221B, 6 pages, describes the pushbutton unloading of granular material from open, hopper-bottom gondola cars. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Atmosphere Equipment

Ammonia dissociators and exothermic and endothermic atmosphere generators are described in bulletin 256, 4 pages. C. I. Hayes Inc., 822 Wellington Ave., Cranston 10, R. I.

Steel Strapping

This 12-page bulletin lists uses of ⅝ to ¾ in. flat strapping. A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill.

Faster Material Handling

Bulletin ECR-106B tells how two-way radios on material handling vehicles speed production. Communications Products Dept., General Electric Co., Syracuse, N. Y.

Flexible Shafts

Line, remote control, and power driveshafts and their specifications, torque loads, and drive speeds are presented in bulletin 5608, 4 pages. Industrial Div., S. S. White Dental Mfg. Co., 10 E. 40th St., New York 16, N. Y.

Plug Valves

This 12-page bulletin tells how to select and apply lubricants to plug valves. Walworth Co., 60 E. 42nd St., New York, N. Y.

Heat Exchangers

Design and cost factors of a tubing with an integral fin 1/16 in. high are covered in this 20-page bulletin. Wolverine Tube, division of Calumet & Hecla Inc., Guardian Towers, Guardian Bldg., Detroit 26, Mich.

Impregnation Sealant

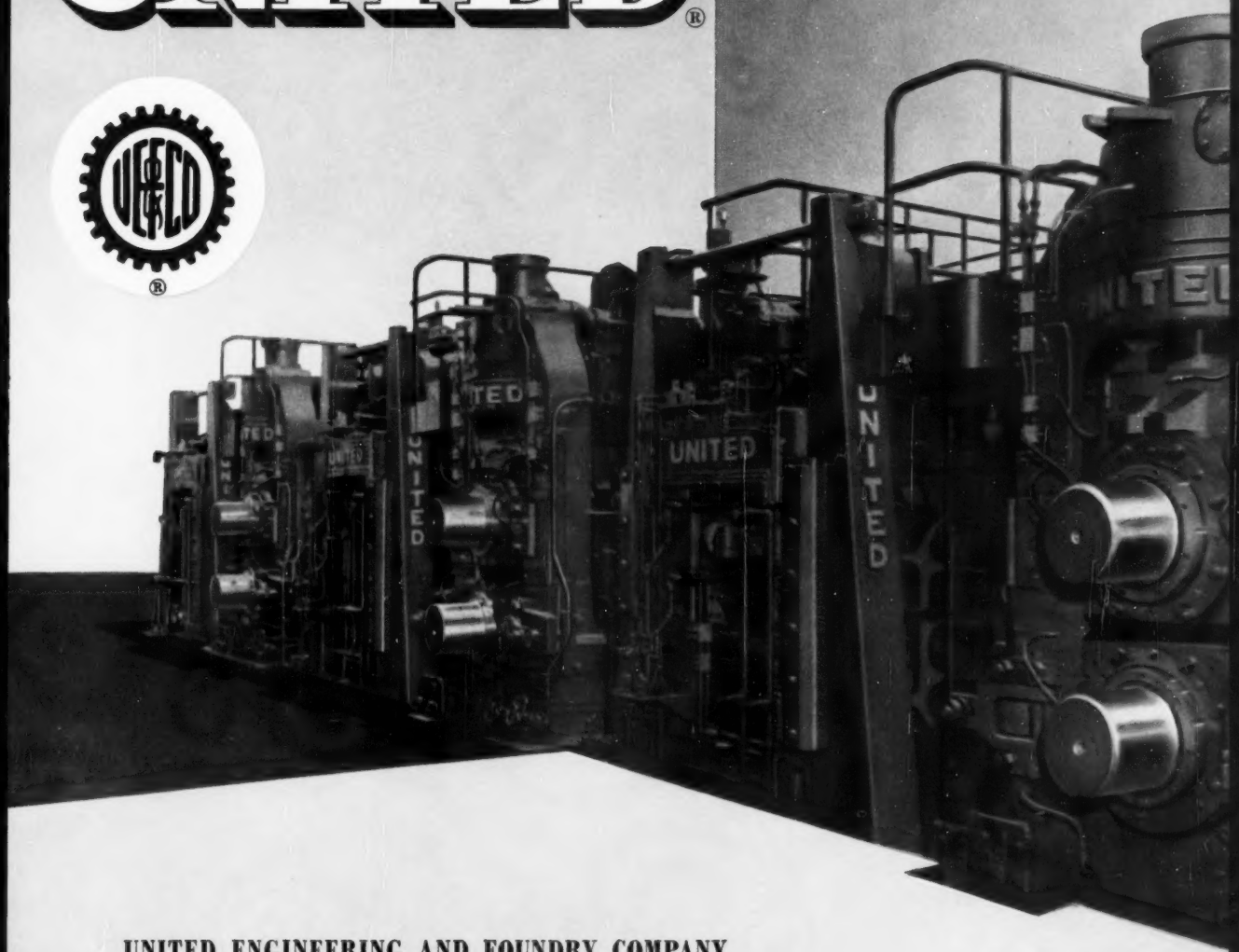
A metallic sealant for porous castings is described in bulletin 8-57, 8 pages. Dept. F-8-57, Imprex Div., Ideal Industries, 2023 S. 60th St., Milwaukee 19, Wis.

Surface Equipment

Surface plates and straight edges are described in bulletin 823, 4 pages. Challenge Machinery Co., Grand Haven, Mich.

UNITED®

6 stand continuous horizontal and vertical Billet Mill



UNITED ENGINEERING AND FOUNDRY COMPANY
Pittsburgh, Pennsylvania

Plants at PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON • WILMINGTON

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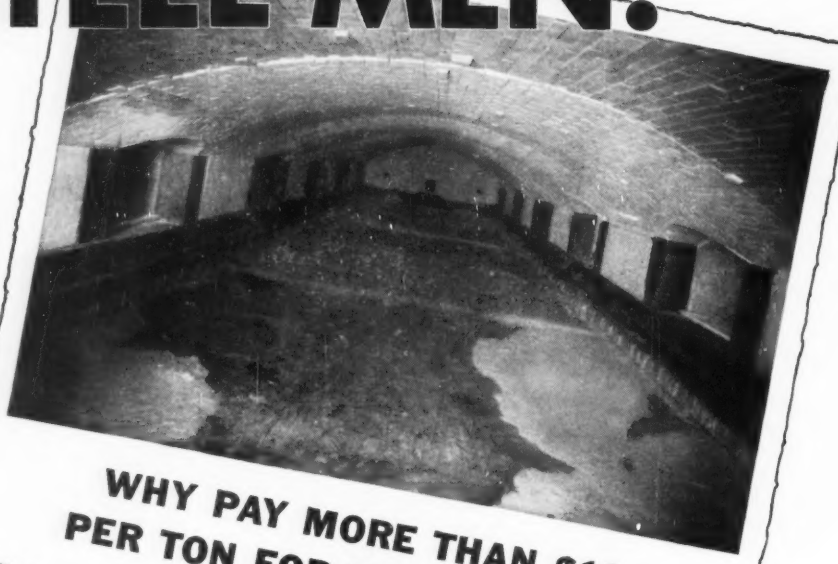
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

STEEL MEN!



WHY PAY MORE THAN $12 PER TON FOR FLUX BLOCKS?

ORIGINALLY, glass tanks were built of small, fire-clay brick or sandstone blocks. No. 1 fire-brick of this type can be bought for $12 per ton. Clay flux blocks of essentially the same materials cost $60 per ton. Why pay a 500% premium simply to get *bigger pieces* of the same material?

Your reply, of course, is that the larger pieces improve furnace life by 40% to 50%—that you are willing to pay 500% more for your blocks, to get 50% greater life for your tanks. And that is true of every glass-tank owner in America today. Since you are already paying a 500% premium for a 50% return, *why is it not logical for you to buy Corhart Electrocast, at a smaller price premium over clay,* AND GET OVER 200% INCREASE IN FURNACE LIFE?

If you are looking for economy in the purchase of your tank blocks, you need pay only $12 per ton. On the other hand, if you want the lowest cost per day of tank life, or the lowest cost per ton of glass produced, you can not stop at the $12 block *or at the $60 block.*

Corhart Electrocast is the world's highest-priced refractory per ton of blocks, and the lowest-cost refractory per ton of glass produced . . . May we *prove* it to you? Write for definite facts. *Address:* Corhart Refractories Co., *Incorporated,* 16th and Lee Sts., Louisville, Ky.

CORHART ELECTROCAST REFRACTORIES

IN June, 1933, when this old ad appeared, Corhart Electrocast was still new in the glass industry. Only a few glass companies dared then to buy it, "one of the world's highest-priced refractories". But today its use is practically universal . . .

Now Corhart 104 is still new in the steel industry — but despite its high price, it offers steel furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to glass.

May we send you complete data? Address: Corhart Refractories Co., Incorporated, 1616 West Lee Street, Louisville, Kentucky, U.S.A., SPring 8-4471.

QUALITY ECONOMY ENDURANCE

CORHART 104 ELECTROCAST REFRACTORY

The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated,* Corhart Refractories Co., *Incorporated,* 1600 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471.

Market Outlook

STEEL PRODUCTION in the first eight months of this year set an all-time record for the period.

Output in the final four months of this year needs to average only 86 per cent of capacity to make this year's total equal to the 117 million ton record set in 1955.

THE RECORD—Production in the first eight months of this year totaled 78.6 million net tons of steel for ingots and castings. To bring this year's output up to the record 117 million tons would require production of 38.4 million tons in the final four months.

The last four months of the year include one that's historically high in steel production—October.

GOOD MONTH—Even though steel output this summer is lower than it was earlier this year, the August yield of 9,180,000 net tons surpassed July's 8,896,000 tons. The only times more steel was turned out in August were in 1953 (9,405,580 tons) and in 1955 (9,594,545 tons).

Steel production in the first eight months of this year was 6.2 million tons ahead of the corresponding period last year.

OUTPUT RISES—The August production averaged 80.5 per cent of capacity, compared with 78.5 per cent in July. As August moved along, operations strengthened. By the last week of the month (week ended Sept. 1), the operating rate was up to 82.5 per cent of capacity.

The 82.5 per cent rate was achieved in the filling of orders that were placed a month or more ago—and ordering then was not brisk. Steel companies are hoping for a pickup in steel demand when the auto industry swings onto its 1958 models in the next few weeks.

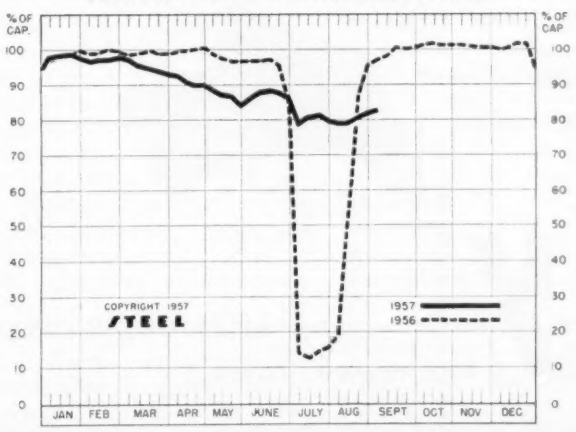
USAGE EXCEEDS BUYING—Steel consumption is not as low, though, as demand. Steel users have been living to a considerable extent on their inventories.

Absence of a steelworkers' strike this year and an increase in steelmaking capacity made steel users confident they could obtain steel promptly. They saw no need to carry large stocks, so they started to use them and reduced their new buying accordingly.

SCRAP DISSENTS—Completion of inventory reduction and an upturn in demand from the automotive industry would suggest that production would rise in the last three or four months of this year. Running contrary to such a move are scrap prices, often regarded as a bellwether of steel production. For the second consecutive week, STEEL's price composite on steelmaking scrap declined. In the week ended Aug. 28, the composite was $52.17 a gross ton, a drop of $1.33 from the preceding week.

STEEL COSTS RISE—Steel started last week to cost the user more although only one producer raised prices. The additional cost comes from a 7 per cent rise in freight charges, which the user pays. The producer which upped steel prices is Kaiser Steel Corp., Oakland, Calif. Although it raised prices pretty much in line with the rest of the industry at the beginning of July, it advanced prices $1 a ton on Aug. 26 on pig iron, plates, structural shapes, hot-rolled sheets, and hot-rolled strip.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Sept. 1	Change	Same Week 1956	Same Week 1955
Pittsburgh	84	+ 2.5*	97.5	95
Chicago	84.5	— 2*	97	95.5
Mid-Atlantic	87.5	— 0.5	96	94
Youngstown	79	0	95	96
Wheeling	92	+ 7	97.5	93.5
Cleveland	89	— 0.5*	103.5	98
Buffalo	95	0	105	105
Birmingham	85.5	0	93.5	93.5
New England	49	+ 2	90	72
Cincinnati	88.5	+ 3.5*	68.5	90.5
St. Louis	76.5	— 3	89	105
Detroit	91	+ 7*	92.5	87.5
Western	98	+ 1	94	103
National Rate	82.5	+ 0.5	97	92.5

INGOT PRODUCTION‡

	Week Ended Sept. 1	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	132.7†	130.8	126.6	148.7
NET TONS (In thousands)	2,132†	2,101	2,033	2,389

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

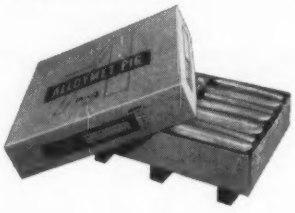
Metalworking Outlook—p. 81 Technical Outlook—p. 129

HOW MUCH NICKEL

IN A CHARGING BOX FULL OF SCRAP?

Even the best guess is never a sure thing. Never as sure as using Alloymet Nickel Alloy Pig. Comes to you in freight-saving all-fiberboard carton with its own pallets — weight and certified analysis right on the side. The whole carton of 26 pigs — about 1300 pounds — goes right into the furnace as is.

Check with us. See how using Alloymet Pig works out in your steelmaking operation.



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DAVENPORT, IOWA

World's largest producer of secondary nickel alloys of certified analysis

Source: American Iron & Steel Institute.

Barmakers Optimistic

September orders are less than desired, but producers expect auto and equipment makers to step up demand in the fourth quarter. Gains may be slow in showing up

BARMAKERS expect to pick up speed in the home stretch and end the year with a good fourth quarter. But you'll have to look closely to see any bright spots in the immediate sales outlook. This product with a multitude of uses is selling slowly now, but encouraging signs are there for the seeing. Here's why some sales managers are optimistic about the fourth quarter:

1. A midwestern producer of alloy bars says orders for early fourth quarter are well ahead of year-ago levels. Ordering usually improves after the third quarter, but October, 1957, should be better than October, 1956.

2. An eastern supplier of cold-finished, leaded bars says sales are strong in New England. Converters are buying all the hot-rolled, leaded bars they can obtain.

3. A maker of hot-rolled bars in the Pittsburgh area reports that the downward sales trend of recent months has been reversed. A wide variety of consumers contribute to the increase. August sales were slightly above July levels. If automakers' purchases increase in the fourth quarter, October shipments should surpass August's.

4. An eastern reinforcing bar firm says many customers are rushing for tonnage in the late third and early fourth quarters as the construction season reaches its peak. Growing interest in re-bars could tighten the entire bar market, a sales manager believes.

5. A Cleveland area mill expects demand from automakers and farm implement producers to pick up the remainder of the year. Most customers are trying to operate with lowest possible inventory, so stocks can't be cut much farther, adds that maker of hot-rolled bars.

No Way but Up—Noting these bright spots, bar salesmen believe their market has no place to go but up in fourth quarter. The gain will be slow, and it begins from a low point. A major hot-rolled bar producer complains that July was the lowest sales month since July, 1954.

American Iron & Steel Institute statistics show that bar shipments declined slightly in the first half, with cold-finished bars taking the greatest proportional fall (see chart above). First-half shipments of hot-rolled bars this year were 49 per cent of total 1956 shipments. The figure for cold-finished bars was only 43 per cent. It should be noted that last year's steelworkers' strike cut into hot-rolled production far more than cold finished, accounting for some of the difference.

Any improvements in sales during August were made without the benefit of large-scale automotive buying. A midwestern supplier of hot-rolled bars comments that free supply limits forward buying by auto producers. The firm has little reason to believe automakers will step up purchases in September. Other producers look for improvement in automotive buying in October.

Need Boost—Most cold-drawn bar mills need an improvement in several consuming industries to snap out of a prolonged slowdown. Demand from textile and machine tool industries is off. Sales managers hope for a fourth quarter increase, but they concede it will probably be slow to develop.

Another slow-moving product, alloy bars, may be quicker to improve. Farm implement requirements for carbon and alloy bars are expected to rise in the final three months. A Pittsburgh pro-

ducer notes increases in inquiries about alloy bars but concedes that these are not backed by large orders.

Producers of lawnmowers, for example, have not placed as heavy orders as is customary for September and October, when their requirements are usually at peak levels.

Inventories the Key—The chief reason for optimism among bar suppliers, in the face of several slow markets, is the belief that many consumers have completed their inventory reduction drive.

A leading midwest producer of hot-rolled bars believes that its 5 per cent gain in sales from July to August was due completely to low bar supplies in hands of consumers.

Comments a sales manager: "No single industry is ahead of the others in bar consumption. We need, and expect, gains in fourth quarter buying by a few leading industries such as auto makers and farm equipment producers to give real strength to this market."

Structural Shapes . . .

Structural Shape Prices, Page 193

Highway construction, especially bridgework, continues outstanding in an otherwise quiet structural market. Fabricators are busy, but competition for contracts is strong. The volume of unfilled business on the books of the smaller shops is shrinking, while backlogs of the medium and large fabricators still run well into next year.

The supply of wide flange sections continues tight. One producer in the Mid-Atlantic district is running four to six weeks behind on delivery promises. Standard shapes are in a better position.

Structural fabricating shops in New England, outside the Boston area, are booking a steady volume of business. In more cases, shipments are in excess of new orders. Boston shops, closed down by strikes since July 16, are reducing specifications for plain material.

In Los Angeles, final settlement of a strike of southern California building trades may have come too late for large school remodeling projects. Construction work valued at close to $15 million is reportedly up for bids.

Steel Bars . . .

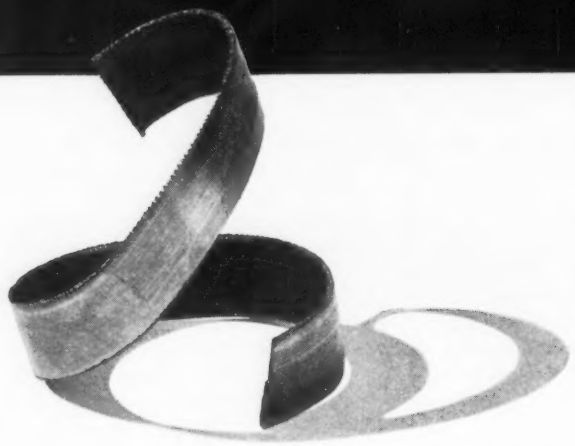
Bar Prices, Page 193

Hot-rolled bar mills report an increase of about 5 per cent in sales during August. September sales are expected to remain at about the August level, unless the present smattering of orders from automakers develops into sizable volume. Automotive requirements have risen only gradually from midsummer lows. Most other consumers of bars have not altered their buying pattern.

Cold-finished bar sales continue light. Producers are filling orders with leadtime of substantially less than one month, making it difficult to predict when demand will increase.

In the Pacific Northwest, rolling mills report unchanged operations. Their backlogs are declining. Recent placements have been confined to a fair volume of small tonnages. Some road projects are pending, but no large steel quantities are involved.

LOOK...NO HANDS!



Sheets, Strip . . .

Sheet & Strip Prices, Pages 194 & 195

Automakers are not expected to make their full weight felt in the cold-finished sheet market for another month. Orders received for production of 1958 models have been for small tonnages and appear designed to fill in holes in inventories. Some disappointment is felt because automotive orders have lacked strength, but most producers don't expect to operate near sheet making capacity until October or November.

Heavier demand for hot-rolled sheets is necessary before sheet mills operate above 75 or 80 per cent of capacity. Hard selling will be needed to fill up September-October rolling schedules.

Producers of galvanized and hot-rolled sheets and strip have open spaces on September order books. Hot-rolled and alloy strip sellers see only scattered indications of an upturn in automotive buying this month. Low demand from building industries holds down sales of galvanized sheet.

More encouraging reports are being received from the St. Louis district. A substantial upturn in hot and cold-rolled sheet orders is underway there. Bookings are coming in at an accelerated pace from fabricators in the Southwest who apparently have liquidated their surplus stocks. The new demand is coming from a variety of industries and is especially strong for cold-rolled sheets. Capacity operations in cold mills in the district throughout September are in prospect.

General Stores Office, Navy, Philadelphia, is closing Sept. 6 and 9 on sheets, strip, and bars for fourth quarter delivery. One lot includes 850 tons of zinc-coated carbon sheets, 500 tons of carbon strip and sheets, and 455 tons of hot-rolled medium carbon bars.

Wire . . .

Wire Prices, Pages 195 & 196

Manufacturers wire sales in Pittsburgh are expected to increase in September, following a slow period caused by vacations and low automotive requirements. Gains will probably be slight. Wire mills continue to book orders for delivery later this month, and most of the orders are for small tonnages, showing that users are maintaining low inventories. Sales managers assume that automakers will only fill in holes in inventory this month, waiting until October before placing larger orders.

Merchant wire sales continue to be slow, in the dull pattern of early third quarter.

In the New England district, a slight increase in demand for furniture wire coils is noted, but interest in cold heading grades lags. Buying interest in wire rods also is slow, and the volume booked this month may be the lowest in years.

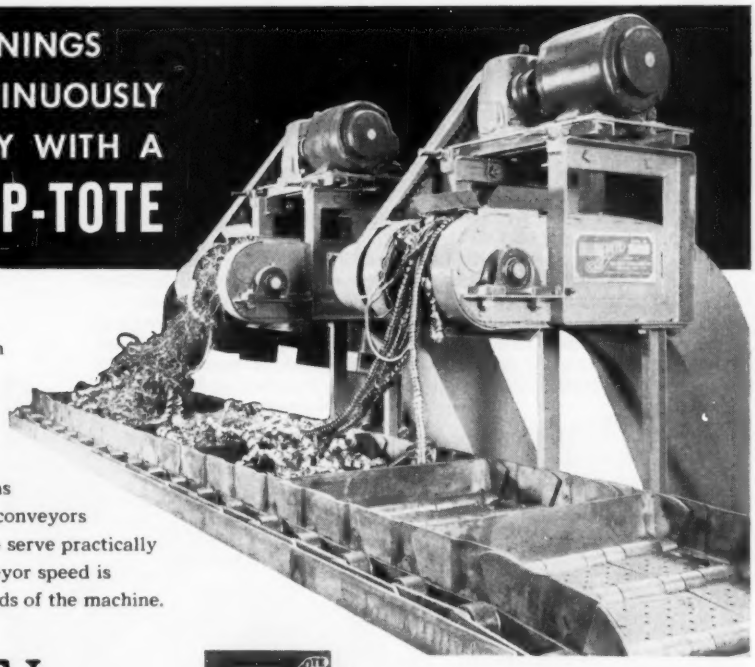
Warehouse . . .

Warehouse Prices, Page 198

Continued easing in the few remaining products still in short supply has curtailed the number of rush orders placed with warehouses. Distributors report no difficulty in obtaining any products except heavy plates from a few

REMOVE CHIPS, TURNINGS AND BORINGS CONTINUOUSLY AND AUTOMATICALLY WITH A

MAY-FRAN CHIP-TOTE



That's right! The May-Fran CHIP-TOTE permits the continuous operation of machine tools by eliminating down-time for scrap removal . . . skilled workers stay on the job . . . production increases by as much as 20%! Versatile CHIP-TOTE conveyors are available in a wide range of sizes to serve practically any type or size of machine tool. Conveyor speed is adjusted to meet the scrap removal needs of the machine.

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Write today for your copy of Bulletin MF-640.

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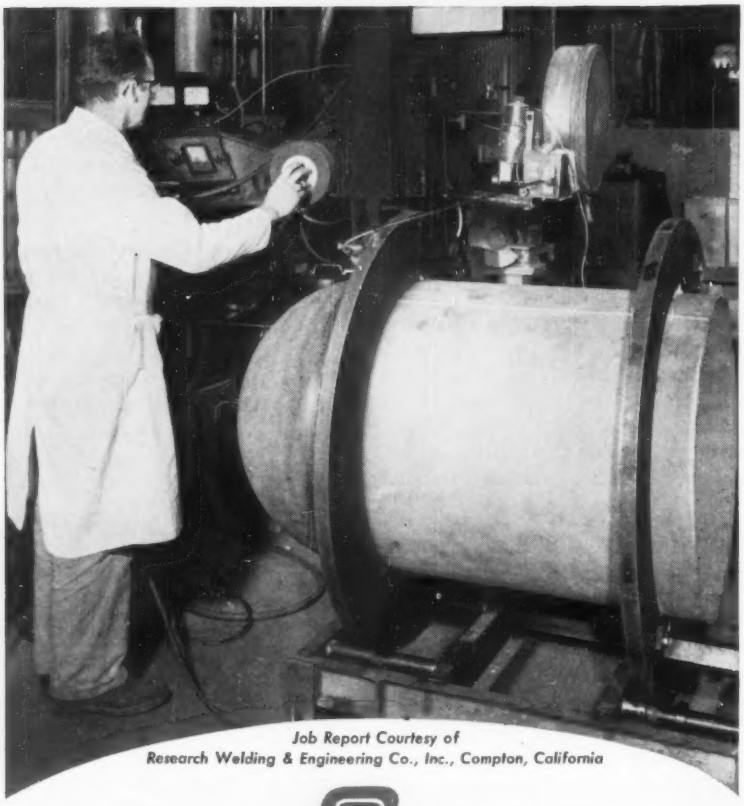
For flawless high strength weld metal in missile components



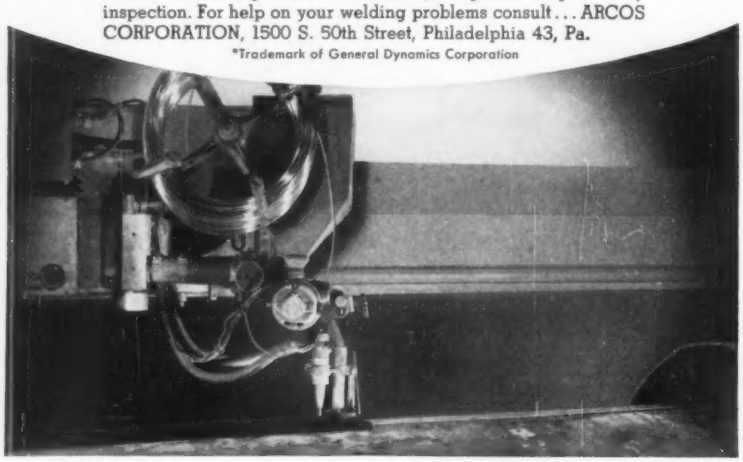
Job Report Courtesy of
Research Welding & Engineering Co., Inc., Compton, California

WELD WITH ARCOS

CHROMENAR Spooled Wire

Light weight was important in this welded missile component that was required to hold air under 3,000 p.s.i. pressure. After making the root pass weld with the Arcos EB* consumable insert, the weld was completed by submerged arc welding with Arcos CHROMENAR CMV welding quality wire. CHROMENAR CMV was selected because its weld metal could be heat treated to match the base metal with tensile strength in excess of 200,000 p.s.i. and pass x-ray inspection. For help on your welding problems consult... ARCOS CORPORATION, 1500 S. 50th Street, Philadelphia 43, Pa.

*Trademark of General Dynamics Corporation



wide plate mills and wide flange beams. They have lost several large customers who can obtain all the plates they require from mills. As a result, their over-all sales show no sign of improvement in September, despite increases in inquiries from small fabricators.

Automakers are placing larger orders with distributors in the Los Angeles district. Industrial construction also is increasing in that area, resulting in a heavier demand for plates, reinforcing bars, and structural shapes.

Distributors in the Philadelphia district have revised cold-finished bar prices and are quoting on a "net price per size" basis. In arriving at the new schedules, they took into account, as a unit, the base and size, analyses, and quality extras. An advance was effected in some items; a reduction in others. Under the revisions, one popular item, (1 in. round C1018) is quoted at 11.51c, warehouse.

Plates . . .

Plate Prices, Page 193

Sheared plate producers anticipate an active fourth quarter. October will be virtually blanked out because of expected carryovers.

Suppliers of universal and stripmill plates are in good balance with demand and may continue so for a while. Strip plates probably will be offered less freely over the remainder of the year because of the likelihood of heavier demand for sheets and strip. But inquiry for that product may not be as heavy. For one thing, demand from railroad equipment builders for it and universal plates is expected to be definitely lighter.

Buying interest in floor plate also is lighter. One producer has experienced a drop of about 25 per cent from late May and early June.

Carbon plate bookings in the New England district are off mildly, with the exception of orders from shipbuilders. Pressure for tonnage has slowed to a point where more selling effort is required. Clad plates and heads are moving slowly; alloy plate demand is holding up well. Except for gages over 1.5 in., carbon plate deliveries are five to six weeks,

with most mills now booking for November.

In the Pittsburgh area, a mill rolling plates 160 in. wide has fallen about one month behind schedule. It is trimming its quotas for each customer for the remaining four months of this year. The firm hopes to bring its production up to schedule by the yearend without "blocking out" any months in the fourth quarter.

Tubular Goods . . .

Tubular Goods Prices, Page 197

A Pittsburgh producer of oil country products says that sales in the second half will be ahead of those in the like 1956 period, despite a slight decline in purchasing from American firms. While his company has made a greater effort to sell to drillers in the Southwest, it has experienced sharp increases in demand from foreign countries. Demand is on the upswing in several countries which have never been important oil drillers because of the troubled situation in the Middle East. As a result, oil country tubemakers selling to foreign countries as well as American drillers will have no trouble in selling fourth quarter production of drill pipe and tube.

Pipe sold to the building industry continues to move slowly, despite reports of a gain in housing starts. A firm selling pipe to steel mills, where it is used in open-hearth lancing, says demand is only fair now, but it is expected to improve if steel production rises in fourth quarter.

Distributors in New England have substantial stocks of seamless pipe 10 in. and under. They report utilities are withholding shipping instructions on some orders placed earlier this year. They probably overordered. Butt-weld inventories also are ample, with mills shipping within two weeks after receipt of orders.

In the St. Louis district, pipe mills are becoming more active and are operating at about 80 per cent of capacity. Demand is moderately heavier although there is little forward buying. September schedules are 75 per cent filled, but there are virtually no bookings for October. Demand in that district

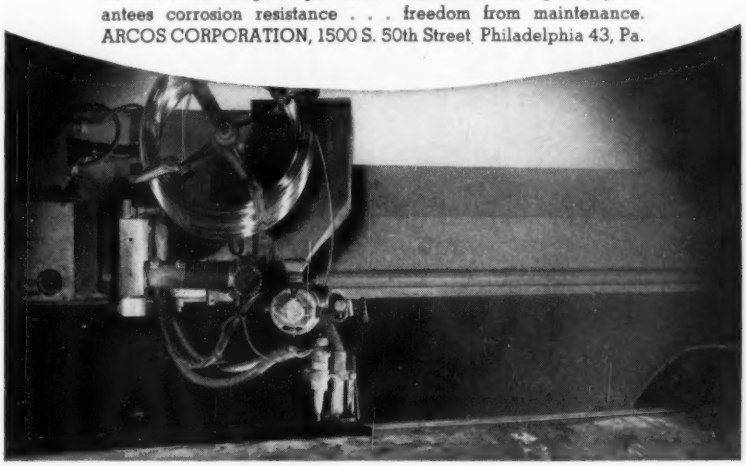
This WELDED nuclear pressure vessel holds a practical idea for you

Job Report Courtesy of Combustion Engineering, Inc., builder of vessel shown

USE ARCOSITE FLUX

for submerged arc welding

In nuclear installations where radio activity makes weld failure dangerous to personnel and can cause indefinite shutdown, sound corrosion resistant welds are of utmost importance. To inhibit corrosion, portions of the 9 ft. dia. interior of this 33 ft. reactor were overlaid with ¼ in. of 308L weld metal. Submerged arc welding with ARCOSITE S4 flux was used for the job. The girth and longitudinal joints of the low alloy steel plates were also submerged arc welded using ARCOSITE B5 flux. Cost-wise, no other conventional method of cladding was practical. Arcos weld metal quality guarantees corrosion resistance . . . freedom from maintenance. ARCOS CORPORATION, 1500 S. 50th Street, Philadelphia 43, Pa.



QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

is heaviest for sizes 2 in. and under.

Export Steel Prices Rise

United States Steel Export Co., New York, revised its list of export price bases to reflect the higher freight rates to North Atlantic seaboard ports. The prices include freight to New York, Philadelphia, and Baltimore on shipments from producing mills starting Aug. 26.

Carbon Steels	Net Ton
Billets, blooms & slabs	
Rerolling quality	$ 86.99
Forging quality	104.99
Tube rounds	126.49
Standard rails (61 lb & over)	118.60
Light rails (60 lb. & under)	138.10
	100 lb.
Joint bars for standard rails	$ 7.84
Tie plates	7.66
	100 lb.
H. R. bars	
Merchant quality	$ 5.97
Special quality	6.32
Skelp	5.58
Stand. structural shapes	5.81
C. B. sections & bearing piles	5.81
Plates	5.59
Floor plates	6.66
Sheet piling	6.72
Concrete reinforcing bars	5.87
Cold finished bars	7.84
H. R. sheets (18 gage & heavier)	5.37
C. R. sheets	6.72
Galv. sheets	7.04
H. R. strip	5.41
Vitrenamel sheets, 12 gage	7.37
Electrical sheets, H. R. Cut length, 22 gage Electrical grade	12.28
Long terne sheets	8.03
C. R. strip (0.25 carbon & under)	7.81
Tight cooperage hoop	5.87
	100 lb.
Wire Products	
Wire rods	$ 6.36
Galvanized plain wire	9.36

Tin Mill Products

107 lb. basis weight (14 x 20 in.—112 sheets) Multiple package metal containers

	Base box
USS common coke tin plate (1.25 lb. coating) superdraw	$10.92
USS ferrostan 25 (0.25 lb. coating—electrolytic) superdraw	9.60
USS special coated manufacturing terne plates—superdraw	10.54
USS black plate—superdraw	8.72

American Standard pipe T & C random lengths

	Discount
Seamless Black	
2 in.	+14.15
2½ in.	+ 7.65
3 in.	+ 5.15
3½ & 4 in.	+ 3.65
5 in.	+ 3.90
6 in.	+ 1.40
Seamless Galvanized	
2 in.	+29.15
2½ in.	+24.40
3 in.	+21.90
3½ & 4 in.	+20.40
5 in.	+20.65
6 in.	+18.15

2-cylinder models 10 to 18 hp.
4-cycle single cyl. models, 3 to 9 hp.
Torque Champs
WISCONSIN ENGINES
3 to 56 h. p.
V-type 4-cylinder models, to 56 hp.
New Model VR4D 43 to 56 hp.
MOST H.R. HOURS
WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
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• *Load-Holding Lugging Power!* That's what you get when you specify Wisconsin Heavy-Duty Air-Cooled Engines... engineered for HIGH TORQUE performance. Here is power that *hangs* on through the shock loads... and *carries on* under either variable or constant-load operating conditions.

Wisconsin basic HIGH TORQUE design pays off in terms of "Most hp. Hours" of on-the-job heavy-duty service, at all temperatures from low sub-zero to 140° F. Team-up your equipment with Wisconsin HIGH TORQUE Champs—backed by over 2,000 Wisconsin Authorized Service Stations, world-wide. Write for full-line "Spec" Bulletin S-212.

A7-6103-½A

Alloy Steels	Net ton
Billets, blooms & slabs	$123.49
	100 lb.
H. R. bars	$ 6.66
H. R. bar shapes	7.08
Plates	7.68
Standard structural shapes	7.03
H. R. strip	8.62
Cold finished bars	8.96

High Strength Steels	100 lb.
Cor-Ten	
Plates	$ 8.12
Std. structural shapes	8.23
C. B. sections	8.23
H. R. sheets	7.77
C. R. sheets	9.46
H. R. bars & bar shapes	8.41
Galv. sheets	10.21
H. R. strip	7.86
Man-Ten "R"	
Plates	6.89
Std. structural shapes	7.01
C. B. sections	7.01
H. R. bars & bar shapes	7.16
H. R. sheets	6.79
H. R. strip	6.60
Abrasion resisting steel	
Plates	7.24
H. R. bars	7.66
H. R. sheets	7.26
H. R. strip	7.15

Pig Iron . . .

Pig Iron Prices, Page 198

With foundry operations spotty, there is no urgency in pig iron buying. Most users are placing their needs on a hand-to-mouth basis, confident that iron will be available when needed.

Some foundries are operating at less than five days a week and are hoping for larger orders in September. Foundries producing large castings for railroad equipment builders continue as one of the brighter spots in the picture. Those pouring castings for the machine tool industry are less active. In the New England district, the larger textile mill equipment shops are operating well below capacity, although several are bidding for iron tonnages from nonintegrated producers. Inventories are low; shipments approximate the melt.

Shenango Furnace Co. has banked its No. 1 blast furnace at Sharpsville, Pa., while it rebuilds its pigging machine and repairs other auxiliary equipment. The other furnace at the plant continues in operation.

New
ARMSTRONG
Armide CARBIDE INSERT
TOOL HOLDERS

STYLE TR
Holds Triangular (6-edge) "Throw Away" Inserts

The advantages of Carbide Cutters with the Multiedged "throw away" ARMIDE inserts

Write for Bulletin CIT

NEW ARMSTRONG Armide Carbide Insert Tool Holders hold multiedged, throw away Armide inserts. They end tool grinding and reduce down time. After an edge dulls, a slight turn of the clamping screw permits rapid indexing of the insert to a new cutting edge. Triangular inserts have 6 cutting edges; square inserts have 8 edges. They are available in three grades—Armide 350, 370, or 883.

ARMSTRONG Armide Carbide Insert Tool Holders are furnished either "Right Hand" or "Left Hand" in the two styles illustrated, each in 3 sizes.

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You'll find Ruemelin Fume Collectors ideal for stopping noxious welding fumes at their source. Counter-balanced inlet hood stays in working area, automatically. Improves working conditions . . . lessens fatigue . . . paves the way for increased plant production. Thousands in everyday service. Write for Fume Collector Bulletin No. 37E.

•

(Left) "Illustrating the 15 ft. reach collector. Handles large or small work. Units available with 9 ft., 15 ft., 17 ft. and 20 ft. reach."

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MFRS. & ENGRS. • SAND BLAST & DUST COLLECTING EQUIPMENT
3882 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

A 8409-1/4 I.

Republic Steel Corp. will soon blow out a furnace at its Youngstown plant for relining. The firm is shipping hot metal to its Warren (Ohio) Works while the Warren blast furnace is undergoing a relining job.

The Philadelphia delivered price on pig iron from Swedeland, Pa., increased 13 cents a ton due to the advance in freight rates on Aug. 26. The rates also boosted the Philadelphia delivered price on low phos iron from Troy, N. Y., by 51 cents.

Iron Ore . . .

Iron Ore Prices, Page 199

Shipments of iron ore to lower Great Lakes ports increased to a daily average of 431,349 tons during the week ended Aug. 26. The figure in the preceding week was 421,152 tons, reports the American Iron Ore Association, Cleveland. Shipments from U. S. and Canadian ports totaled 3,019,443 tons in the latest period, compared with 2,948,063 tons in the week ended Aug. 19 and 2,305,387 tons in the like week a year ago.

Cumulative shipments through the week ended Aug. 26 were 55,422,606 tons, an increase of 15,295,679 tons over the total for the like period a year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2200 tons, plant addition, Western Electric Co., Inc., North Andover, Mass., to Bethlehem Fabricators, Inc., Bethlehem, Pa., direct by owner.

1000 tons or more, Ringling Causeway bridge, Sarasota Bay, Florida, to Nashville Bridge Co., Nashville, Tenn.; Hardaway Construction Co., Columbus, Ga., general contractor; reinforcing, Florida Steel Co., Tampa., Fla.

860 tons, 8-span WF beam bridge, East Peoria, Ill., to Illinois Steel Bridge Co., Jasksonville, Ill.

500 tons or more, mens' intramural building, Michigan State University, Lansing, Mich., to R. C. Mahon Co., Detroit; Granger Bros. Inc., Lansing, Mich., general contractor; reinforcing, Capitol Steel Div., Lansing.

450 tons, grade separation, U. S. Route 460, near Belleville, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

220 tons, grade separation and bridge over Dupage River, near Joliet, Ill., to Vierling Steel Works, Chicago.

120 tons, galvanized transmission towers for Bonneville Power Administration, to Bethlehem Pacific Coast Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

1118 tons, state bridge work, Erie County, Pennsylvania; bids Sept. 13.

1100 tons, state bridge work, Lehigh County, Pennsylvania; James D. Morrissey Inc., Philadelphia, low on general contract.

1000 tons, six highway bridges, Southeast Expressway, Braintree-Weymouth, Mass.

700 tons, storage warehouse for shapes and plates for California Bag Co.'s Steel Div., Portland, Oreg.; Teeples & Thatcher, Portland, low $292,000 for general contract; Joseph M. Fought Co., Portland, low $164,495 for structural steel.

675 tons, Nisqually River bridge, Rainier National Park, Washington State; Carl M. Halvorson Inc., Portland, Oreg., low to Bureau of Public Roads, $1,243,280, prestressed concrete; alternative, $1,164,185, plate girder.

500 tons, classroom addition, Montana State College, Bozeman, Mont.; Crown Iron Works, St. Paul, reported low.

403 tons, state bridge work, Allegheny County, Pennsylvania; bids Sept. 13.

300 tons, 527-ft steel truss span, Siskiyou River, Oregon; bids to Bureau of Public Roads, Portland, Oreg., Sept. 5.

117 tons, state bridge work, Lehigh County, Pennsylvania; Glasgow Inc., Glenside, Pa., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

580 tons, substructure, Connecticut River bridge, Greater Hartford Bridge Authority, Wethersfield-Glastonbury, Conn., to Plantations Steel Co., Providence, R. I.; Brunalli Construction Co., Southington, Conn., general contractor.

REINFORCING BARS PENDING

2500 tons, Flaming Gorge dam and powerplant, Utah-Wyoming, Green Division, Colorado River Storage project; bids late in year, Bureau of Reclamation, Denver; also installing 625 tons, penstocks and outlets; 1500 tons, gates, hoists, and miscellaneous metalwork.

650 tons, including 345 tons, highway mat reinforcing, highway and bridge structures, Plates Borough, Erie County, Pennsylvania; bids Sept. 13, Harrisburg, Pa., also 1120 tons, structural steel.

390 tons, Washington State highway projects, Pierce, Kittitas, Whatcom, Grant, and Douglas counties; bids to Olympia, Sept. 10.

225 tons, also 175 tons shapes, Washington State Skagit River bridge; bids to Olympia, Sept. 10.

155 tons, including 90 tons highway mat reinforcing, highway and bridge structures, Heidelberg Borough, Pa.; bids Sept. 13, Harrisburg, Pa.; also 405 tons, structural steel.

140 tons, also 100 tons shapes, Garfield Street underpass, Seattle; MacRae Bros., Seattle, low $538,482 for precast concrete beams; $540,694 for pretensioned; $540,699 for combination.

PLATES . . .

PLATES PLACED

1500 tons, 14,000 ft of 42 and 48-in. water supply pipe, to Beall Pipe & Tank Co., Portland, Oreg., by Everett, Wash.

1200 tons, general stores supply office, Navy, Philadelphia, to Colorado Fuel & Iron Corp., Wilmington, Del.; two contracts.

150 tons, 500,000-gal. elevated water tank, Vandalia, Ohio, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

10,000 tons, four single screw cargo vessels, American Export Lines, New York; bids Oct. 30, Federal Maritime Board, Washington.

500 tons, 1540 ft of 72 and 108-in. pipe, Cougar Dam project, Lane County, Oregon; bids to U. S. Engineer, Portland, Oreg., Sept. 12.

100 tons or more, treatment plant, West Linn, Oreg.; bids Sept. 18.

PIPE . . .

CAST IRON PIPE PENDING

200 tons, 12 and 16 in. for E. 125th Street extension, Seattle; Thorburn & Logozo, Seattle, low $92,652 for general contract.

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$6.78	$7.01	$6.76	$6.44
Merchant Bars (¼" Round incl. all extras)	7.62	7.85	7.48	7.22
Bands (1"x⅛"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C, (11½ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14G, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	....	....
Tubing (2⅜", 6.4 J55, EUE, per 100')	103.00	104.00	....	....
Forged R Turn. Bars, C-1035 (from 10" dl.)	14.00	14.23	14.00	13.74

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

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BOCHUMER VEREIN World's first Steel Foundry, 1842—Vacuum degassed Forgings. Pinion wire and spring wire for watches and clocks.
DORTMUNDER UNION Originators of Interlock Sheet Piling—Larssen Sheet Piling, Plate, Shapes, Forged Bars and Shafts.
NIEDERRHEIN Europe's most modern Rod Mill—OH, CH, Low Metalloid, Specialty Wire Rod, Merchant Bars.
WESTFAELISCHE UNION Europe's largest Wire Mill—All types drawn Wire and Wire Products—Nails, Barbwire, Wire Rope, Prestress Concrete Wire and Strand.
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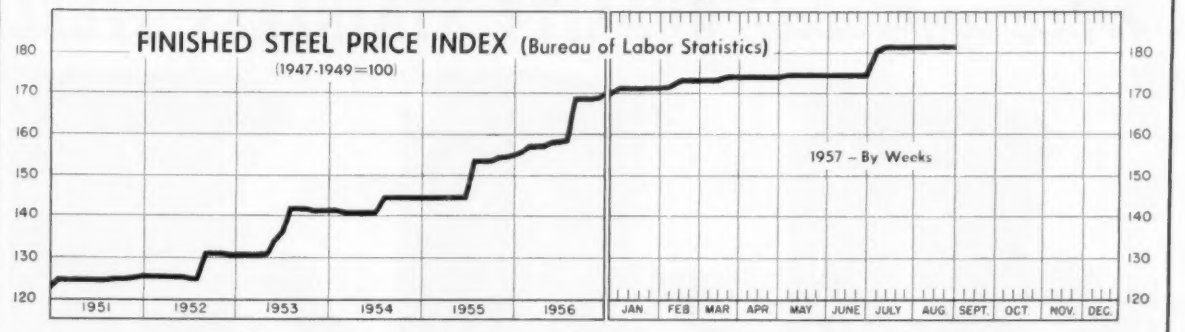
Price Indexes and Composites



Aug. 27, 1957	Week Ago	Month Ago	Aug. Avg.	Year Ago
181.5	181.5	181.5	181.5	168.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)
Week Ended Aug. 27

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	9.193
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 28 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.71	181.40
Index in cents per lb	6.479	6.479	6.479	6.114	4.914

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$146.19	$146.19	$146.19	$137.75	$113.23
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	52.54
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	52.16
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	53.27
Steelmaking Scrap, GT	52.17	53.50	54.50	58.83	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 28 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.715	5.715	4.93	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.525	5.525	5.00	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.50	5.50	5.50	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.00
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-5.60
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	4.85-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.35	5.90-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, $\frac{7}{32}$-$\frac{9}{32}$" Pitts.	6.15	6.15	6.15	5.80	4.325

PIG IRON, Gross Ton	Aug. 28 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$53.00
Basic, Valley	66.00	66.00	66.00	62.50	52.00
Basic, deld., Phila.	70.01	69.88	69.88	66.26	56.75
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	52.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	52.50
No. 2 Fdry, deld., Phila.	70.51	70.38	70.38	66.76	57.25
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	56.43
Malleable, Valley	66.50	66.50	66.50	63.00	52.50
Malleable, Chicago	66.50	66.50	66.50	63.00	52.50
Ferromanganese, Duquesne.	255.00†	255.00†	255.00†	215.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$54.50	$55.50	$56.50	$58.50	$44.00
No. 1 Heavy Melt, E. Pa.	51.00	52.00	53.00	59.00	41.50
No. 1 Heavy Melt, Chicago	51.00	53.00	54.00	59.00	42.50
No. 1 Heavy Melt, Valley	54.50	55.50	55.50	64.50	44.00
No. 1 Heavy Melt, Cleve.	51.50	52.50	52.50	62.00	43.00
No. 1 Heavy Melt, Buffalo	49.50	49.50	46.50	56.50	43.00
Rails, Rerolling, Chicago	71.50	74.50	79.50	84.50	52.50
No. 1 Cast, Chicago	45.50	46.50	47.50	53.50	50.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	17.50	17.00

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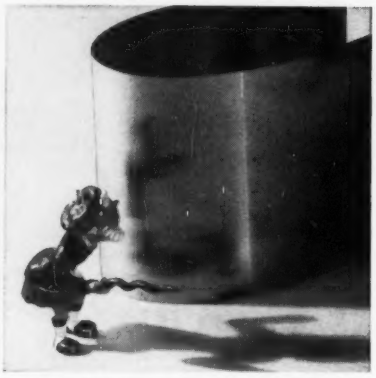
MicroRold® QUALITY STAINLESS STEEL

2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.



No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.

BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

WASHINGTON STEEL CORPORATION — MicroRold® — STAINLESS SHEET & STRIP

Washington Steel *Corporation*

Producers of Stainless Sheet and Strip Exclusively

9-0 WOODLAND AVENUE, WASHINGTON, PA.

Steel Prices

Mill prices as reported to STEEL, Aug. 28, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 194; to footnotes, page 196.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B2 .....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19 .101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3 .101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2,U5,W14 ..96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ..105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. N19.114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3.121.00
Detroit S41 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 ...114.00
Lackawanna,N.Y. B2.114.00
LosAngeles B3 .....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14.114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland,O. R2 ....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ..117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 ....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ...6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 .....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ..5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ....5.50
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ...5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 5.525
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ....5.50
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10 .5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 ....5.70
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.50
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 ....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown R2, U5, Y1.5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.35
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Johnstown,Pa. B2 .....7.00
SparrowsPoint,Md. B2 ..7.00

PLATES, Wrought Iron
Economy,Pa. B14 ....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 ....7.925
Conshohocken,Pa. A3..7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Lackawanna,N.Y. B2 ..7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2 7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, Alloy
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 ....7.20
Coatesville,Pa. L7 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14 7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ..6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ....5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 .....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ...5.525
Emeryville,Calif. J7 ...6.175
Fairfield,Ala.(9) T2 ..5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston(9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5 .5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11 6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5 ..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ...5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11 6.125
Youngstown(9) R2, U5 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. N19 . 6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrel,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.925
Bessemer,Ala. T2 ....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ..5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 .....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ..7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.80
Hammond,Ind. J5, L2..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles P2, S30 ....8.75
LosAngeles R2 .....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ...7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 .....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ...7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Amoridge,Pa. W18 ...8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. N19..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2..8.775
LosAngeles P2, S30 ..10.65
Mansfield,Mass. B5 ...9.075
Massillon,O. R2, R8 ..8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ...8.975
S.Chicago W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ...9.075
Youngstown F3, Y1 ...8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 ..5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 .....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ...6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ....6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy(Staybolt)B14 .18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 .5.325
ChicagoHts.(4)(44) I-2.5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa.(3) F5 ...5.325
Franklin,Pa.(4) F5 ...5.425
JerseyShore,Pa.(4) J8 ..5.30
Marion,O.(3) P11 .....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10....4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless, Pa. U5 .....4.975
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
Granite City,Ill.(8) G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky. (8) A2 ..4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2..4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 .....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2,Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna(35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill, U5,W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 .....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 .....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ....10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint(38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	.....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	.....6.95	7.20
Kokomo,Ind. C16	..7.05	...
MartinsFry. W10	.6.95	7.20
Pittsburgh J5	....6.95	...
Pitts.,Calif. C11	..7.70	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 .6.60*
Middletown,O. A10 ...6.60†
Pittsburg,Calif. C11 ..7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 ..... 9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.425
Niles,O.(28) R2 .....7.425
Weirton,W.Va. W6 ...7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke. Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J8 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&.W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons. John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ...4.925
Atlanta A11 .....5.125
Bessemer,Ala. T2 .....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa.(25) B2..4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Pittsburg,Calif. C11 ..5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....6.35
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.SanFrancisco(25) B3..5.675
SparrowsPoint,Md. B2..4.925
Sterling,Ill.(1) N15 ....4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 .....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. S3 .....8.10
S.Chicago,Ill. W14 .....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1 7.325
Lackawanna,N.Y. B2 ..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3..8.075
SparrowsPoint,Md. B2. 7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ...7.325

Strip, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20....7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 .....9.00
FranklinPark,Ill. T6 ...7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles C1 .....9.20
NewBedford,Mass. R10 .7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
NewKensington,Pa. A6..7.15
Pawtucket,R.I. R3 .....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia(45) P24 ...7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y.(32) R6 .....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J.(31) R5 ...8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 .....7.15
Weirton,W.Va. W6 .....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.25
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 ....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 ....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ...15.55
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45
Weirton,W.Va. W6 ...10.45
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 .....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

STRIP, Cold-Finished

Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
NewYork W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP coils)	...	11.35	12.05	13.15	14.20

	Transformer Grades			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	..	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ¼c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2,	10.15	10.40
Fairless,Pa. U5 .	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5 ...	10.05	10.30
Irvin,Pa. U5 ...	10.05	10.30
Pitts.,Calif. C11.	10.80	11.05
Sp.Pt.,Md. B2 ..	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 .....7.95
Ind.Harbor,Ind. I-2, Y1 7.85
Irvin,Pa. U5 .....7.85
Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ....8.60
SparrowsPoint,Md. B2 ..7.95
Weirton,W.Va. W6 .....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville,Ill. K4 .....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 ....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ...8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16..7.65
N.Tonawanda,N.Y. B11..7.65
Palmer,Mass. W12 .....7.95
Pittsburg,Calif. C11 ....8.60
Portsmouth,O. P12 .....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P16 .....12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....12.95
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16...9.30
NewHaven,Conn. A7 ...9.60
Palmer,Mass. W12 .....9.60
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6...9.60
Minnequa,Colo. C10 ....9.55
Monessen,Pa. P7, P16..9.30
Muncie,Ind. I-7 .....9.50
Palmer,Mass.(12) W12 ..9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth, O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester, A7, J4, T6...9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8..15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ...15.85
Monessen,Pa. P7, P16..15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....15.90
S.SanFrancisco C10 ...16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6..15.90

ROPE WIRE

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 ....13.05
Portsmouth,O. P12 ....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ...12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ...13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

	Col.
Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

	Col.
Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.95
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Houston,Tex. S5	178
Fairfield,Ala. T2	173
Jacksonville,Fla.(20) M8	184
Joliet,Ill. A7	173
Johnstown,Pa. B2	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.95

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Joliet,Ill. A7	175
Johnstown,Pa. B2	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	9.82
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.15
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.20
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
Sterling,Ill.(7) N15	214
SparrowsPt.,Md. B2	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston,Tex. S5	198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198§

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston,Tex. S5	192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192§

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa.	J5.17.15	18.95
Bartonville	K4..17.25	19.05
Cleveland	A7 ...17.15	....
Crawf'dsville	M8 17.25	19.05
Fostoria,O.	S1 ..17.65	19.20†
Houston	S5 ....17.40	18.95**
Jacksonville	M8.17.50	19.30
Johnstown	B2 ..17.15	18.95§
Kan.City,Mo.	S5 17.40	....
Kokomo	C16 ...17.25	18.80
Minnequa	C10..17.40	18.95**
P'lm'r,Mass.	W12 17.45	19.00†
Pitts.,Calif.	C11..17.50	19.05†
SparrowsPt.	B2..17.25	19.05§
Sterling(37)	N15..17.25	19.05§
Waukegan	A7 ..17.15	18.70†
Worcester	A7 ..17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	.8.65 9.20**
Aliquippa J5	....8.65 9.325§
Atlanta (48) A11	.8.75 9.425*
Bartonville(48) K4	.8.75 9.425
Buffalo W12	....8.65 9.20†
Cleveland A7	....8.65 ....
Crawfordsville M8	8.75 9.425
Donora,Pa. A7	...8.65 9.20†
Duluth A7	.....8.65 9.20†
Fairfield T2	.....8.65 9.20†
Houston(43) S5	..8.90 9.45**
Jacks'ville,Fla. M8	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	....8.65 9.20†
Kans.City(48)	S5.8.90 9.45**
Kokomo C16	....8.75 9.30†
LosAngeles B3	..9.60 10.275§
Minnequa C10	...8.90 9.45**
Monessen P7(48)	..8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	..9.60 10.15†
Rankin,Pa. A7	..8.65 9.20†
S.Chicago R2	...8.65 9.20**
S.SanFran. C10	.9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	..8.90 9.575§
Sterling(1)(48)	..8.80 9.475§
Struth'rs,O.(48) Y1	8.65 9.30‡
Worcester,Mass. A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1⅛ in. and larger:	
All lengths	35.0
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0

Blank Bolts 39.0
Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:

⅛ to ¼-in. incl., 3 in. and shorter	55.0
⅝ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

⅜ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl. Slotted and Castillated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	40.0
¾, ⅞ and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞ and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	26.0
¾, ⅞ and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+13.0
¾, ⅞ and 1 in. diam.	+32.0

Flat Head Capscrews:

⅝ in. and smaller	+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam:
6 in. and shorter... Net
Longer than 6 in... +23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.25
$\frac{1}{16}$ in. under list less 19%.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Huntington,W.Va. C15	....	....	....	6.50
Gary,Ind U5	5.525	5.425	....	....
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES

Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 8.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Mfg. & Supply Co.; Kennmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.755
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	..	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	3.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	*68.62*	*69.12*	*69.12*	*69.62*
Muskegon,Mich., deld.	....	*74.12*	*74.12*	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,O., deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	*75.10*	*75.60*	....
Newark,N.J., deld.	*72.20*	*72.70*	*73.20*	*73.70*
Philadelphia, deld.	*70.01*	*70.51*	*71.01*	*71.59*
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,O., deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	66.50	67.00	67.50	....
Fontana,Calif. K1	*75.00*	*75.50*	....	....
Geneva Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9. K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	*82.27*
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.$	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13‖	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.76	....	8.76	9.06	9.13[3]	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	10.15	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.31	10.40	11.41	....	9.35	9.68	....	15.24	9.59	9.65	11.13
Buffalo	8.25	9.45	11.07	....	8.50	8.80	....	15.00	8.90	8.90	10.45
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	8.20	9.45	10.00	....	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	....	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	....	8.33	8.69	....	14.74	9.01	8.79	10.11
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	....	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	9.05	11.10	....	9.10	9.05	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.50	10.75	11.65	....	9.55	9.70	12.75	16.00	9.60	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	. ..	8.99	8.91	....
New York	8.87	10.13	10.56	....	9.31	9.57	....	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.67	8.65	11.51#	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	....	14.65	8.64	8.56	9.88
Portland, Oreg.	9.50	11.20	11.55	57.20	11.35‡‡	9.65	14.65	15.95	9.65	9.30	12.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	54.85	9.45	9.70	13.00	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.20	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Spokane, Wash.	9.95	11.15	12.00	....	10.00	10.10	14.05	17.10	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras, except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; ‖2 in. and under; **⅜ in. and heavier; ††as annealed ‡‡over 4 in.; §§over 3 in.; #1 in. round C1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [8]—1000 to 1999 lb; [9]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 100)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185, Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfield, Pa., $110; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, O., $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-34; Mexican, all-rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	30.00

Tungsten Ore

Net ton, unit, before duty

Foreign wolframite, good commercial quality	13.75-14.25
Domestic, concentrates mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.35-$1.45 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, $1.35-$1.45; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00

Turkish

48% 3:1	$59.00-62.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard 55-60%	$2.90-3.30
60-65%	3.30-3.60

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish, Deld. east of Mississippi river, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N.J., west of Mississippi River	9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: .... Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500 lb drum, frght allowed	
Carlots	*39.50*
Ton lots	*41.50*
Antimony, 500 lb lots.	32.00*
Brass, 5000-lb lots .....*32.00-39.70*†	
Bronze, 5000-lb lots .....*49.50-54.10*†	
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh ...	70.00
Minus 200 mesh ...	75.00
Nickel, unannealed ...	$1.15
Nickel-Silver, 5000-lb lots	*50.20-54.80*†
Phosphor-Copper, 5000-lb lots	*61.30*
Copper (atomized) 5000-lb lots .....*41.80-50.30*‡	
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	*$1.02*
Stainless Steel, 316	*$1.20*
Tin 14.50*	
Zinc, 5000-lb lots 17.50-30.70‡	
Tungsten: Dollars Melting grade, 99% 60 to 2000 mesh:	
1000 lb and over ...	3.75
Less than 1000 lb ..	3.90
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

——Inches—— Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Ore within $4.80 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account Source of shipment: Western continental European counties)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$6.58	$6.53	$6.53	$6.76
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.50	8.45	8.45	8.75
Sheets, H.R.	8.50	8.45	8.45	8.75
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ⅝ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (‡)	8.38	8.38	8.38	8.58

†Per 82-lb. net. reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si. $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $255, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb of contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk, 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 20.00c per lb of Si. Packed, c.l. 21.65c, ton lot 22.95c, less ton 23.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%. Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%. Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23.25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

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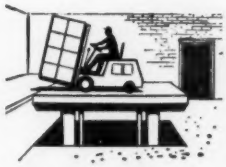

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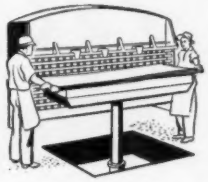

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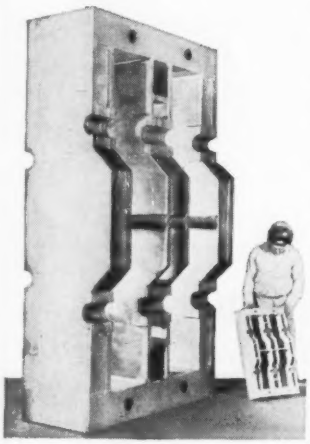

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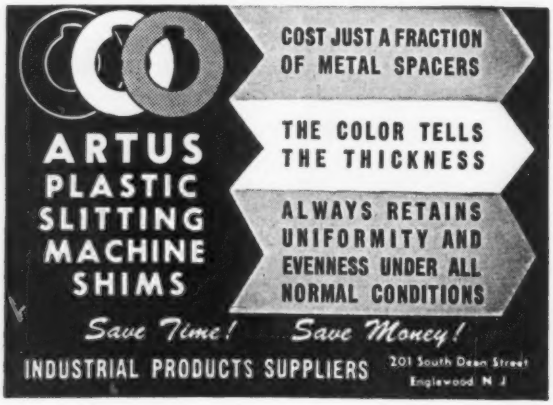
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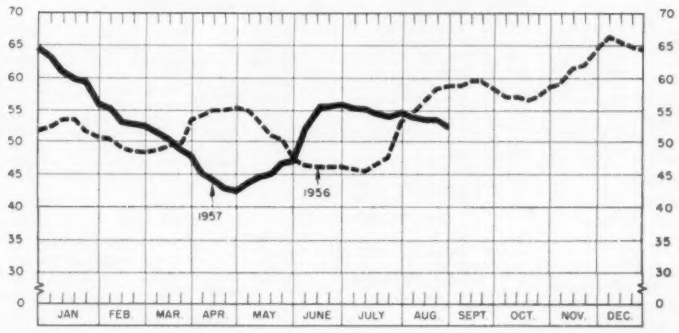
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL



Aug. 28 1957	Week Ago	Month Ago	Year Ago	July Avg.
$52.17	$53.50	$54.50	$58.83	$54.67

Scrap Prices Continue To Drop

STEEL's composite on No. 1 heavy melting steel declines to $52.17, lowest level since last May. Market lacks domestic buying support

Scrap Prices, Page 204

Pittsburgh—Scrap prices are beginning to show weakness, following a prolonged period of slow buying by mills. Although prices are nominal, most grades declined $1 per ton, partially in a reaction to lower prices in neighboring areas. An independent mill is purchasing No. 2 bundles at $44 per ton—$2 below the last price for that grade. Factory bundles are also weakening.

Chicago—Scrap prices continue to skid here. Drops of $2 to $3 a ton on important grades have been added to those posted previously, pushing the level to the lowest since early June. Consumers are in the driver's seat. Following purchases of sufficient tonnage to establish prices, they withdraw from the market.

Philadelphia—The price on No. 1 heavy melting steel is off $1 a ton to $51, delivered, on a light purchase. No. 2 heavy melting is off 50 cents a ton to $45.50 and No. 2 bundles are at $42.50, down $1. Declines on other grades brought prices to $55 on electric furnace bundles, $36 on mixed borings and turnings, and $47 on heavy turnings. All other grades, including cast, are unchanged. Some trading was done in malleable at $62, delivered.

Demand for open hearth scrap for export continues active. Two ships are being loaded, one for Argentina, with the cargo reportedly comprising No. 1 heavy melting steel only. Usually, export shipments include equal portions of No. 1 and No. 2 heavy melting steel and No. 2 bundles.

New York—Reflecting a lack of interest by the mills, scrap brokers have reduced their buying prices $1 a ton on all steel grades for domestic shipment. They similarly reduced prices on heavy breakable cast.

Nickel-bearing steel scrap prices have dropped sharply because of the increasing supply of nickel and the slow rate of buying by consumers. Brokers have reduced prices on 18-8 sheets, clips, and solids to $235-240, on 18-8 borings and turnings to $135-140. Prices on straight chrome grades are unchanged.

Boston—Accompanied by a lack of buying from domestic consumers, primary grades of steel scrap declined $1.50 a ton. Brokers are paying $40 to $40.50 a ton, f.o.b. shipping point. Borings and turnings are notably slow. Cast scrap buying is confined to small lots with most foundries holding down their inventories.

Strong demand for steel scrap for export has depleted yard stocks at points where the freight rates are low to loading ports. Export prices for heavy melting steel range around $2 a ton over brokers' buying prices.

Buffalo—The scrap market here was extremely dull last week. Dealers have been shipping against outstanding August mill orders and expect to have them cleaned up before the end of the month.

Little pressure is being exerted on the market in either direction, and most dealers believe that September prices will hold around current levels. Mills in this district are taking in fairly good sized tonnages of material, but there is no urgency to buy.

The specialty market is showing a fair amount of activity with prices holding steady. Cast business is dull, with foundries buying their needs on a hand-to-mouth basis.

Detroit—Scrap prices dropped rather sharply here as August auto lists closed. Ford Motor Co. sold an advertised 10,000 tons. Dealers and brokers report sales have been slow. Little scrap is being generated. Some tonnage has been shipped in from Ohio.

Youngstown—The iron and steel scrap market continues to mark time. Some No. 1 heavy melting scrap is moving on old orders placed by two steel firms at $57 a gross ton. No No. 2 scrap has been sold for some time, and scrap is beginning to pile up in yards. A lot of it is high priced material; dealers are reluctant to let it go at too low a figure.

Cincinnati—Principal steelmaking grades of scrap are standing still pricewise in a market that shows signs of weakening. The weak undertone will probably be reflected at the beginning of September on new buying by mills. Scrap prices are finding some support by final covering by brokers on old orders. Brokers' buying prices on mixed borings and turn-

(*Please turn to Page* 209)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Aug. 28, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 28	$52.17
Aug. 21	53.50
July Avg.	54.67
Aug. 1956	57.13
Aug. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 factory bundles	*61.00-62.00*
No. 1 dealer bundles	*54.00-55.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*54.00-55.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*36.00-37.00*
Cast iron borings	*36.00-37.00*
Cut structurals:	
2 ft and under	*62.00-63.00*
3 ft lengths	*61.00-62.00*
Heavy turnings	*49.00-50.00*
Punchings & plate scrap	*61.00-62.00*
Electric furnace bundles	*61.00-62.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	47.00-48.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt	*62.00-63.00*
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	73.00-74.00
Railroad specialties	72.00-73.00

Stainless Steel Scrap

18-8 bundles & solids	300.00-315.00
18-8 turnings	190.00-215.00
430 bundles & solids	80.00-85.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 factory bundles	*56.00-57.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*42.00-43.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	23.00-24.00
Short shovel turnings	27.00-28.00
Mixed borings, turnings	27.00-28.00
Cast iron borings	27.00-28.00
Cut foundry steel	*54.00-55.00*
Cut structurals, plates 2 ft and under	*60.00-61.00*
Low phos. punchings & plate	*52.00-53.00*
Alloy free, short shovel turnings	30.00-31.00
Electric furnace bundles	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Charging box cast	*41.00-42.00*
Heavy breakable cast	*39.00-40.00*
Stove plate	*48.00-49.00*
Unstripped motor blocks	*35.00-36.00*
Brake shoes	*39.00-40.00*
Clean auto cast	*52.00-53.00*
Burnt cast	*37.00-38.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt	*55.00-56.00*
R.R. malleable	*59.00-60.00*
Rails, 2 ft and under	*73.00-74.00*
Rails, 18 in. and under	*74.00-75.00*
Rails, random lengths	*66.00-67.00*
Cast steel	*64.00-65.00*
Railroad specialties	*66.00-67.00*
Uncut tires	*61.00-62.00*
Angles, splice bars	*66.00-67.00*
Rails, rerolling	*71.00-72.00*

Stainless Steel (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*260.00-270.00*
18-8 turnings	*160.00-170.00*
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*54.00-55.00*
Machine shop turnings	23.00-24.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	*56.00-57.00*
Electric furnace bundles	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt	*58.00-59.00*

CHICAGO

No. 1 heavy melt., indus.	*52.00-53.00*
No. 1 hvy melt., dealer	*49.00-50.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 factory bundles	*55.00-56.00*
No. 1 dealer bundles	*50.00-51.00*
No. 2 bundles	39.00-40.00
No. 1 busheling, indus.	*52.00-53.00*
No. 1 busheling, dealer	*49.00-50.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*34.00-35.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	*34.00-35.00*
Cut structurals, 3 ft	*54.00-55.00*
Punching & plate scrap	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	*43.00-44.00*
Unstripped motor blocks	*32.00-33.00*
Clean auto cast	*50.00-51.00*
Drop broken machinery	*50.00-51.00*

Railroad Scrap

No. 1 R.R. heavy melt	*54.00-55.00*
R.R. malleable	*58.00-59.00*
Rails, 2 ft and under	*70.00-71.00*
Rails, 18 in. and under	*71.00-72.00*
Angles, splice bars	*65.00-66.00*
Rails, rerolling	*71.00-72.00*

Stainless Steel Scrap

18-8 bundles & solids	275.00-285.00
18-8 turnings	175.00-185.00
430 bundles & solids	95.00-100.00
430 turnings	65.00-70.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*26.00-27.00*
Short shovel turnings	*27.00-28.00*
Punchings & plate scrap	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	43.00
Stove plate	44.00
Heavy breakable	42.00
Unstripped motor blocks	30.00-31.00
Clean auto cast	52.00
Malleable	53.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	49.50
No. 2 heavy melting	47.00
No. 1 bundles	49.50
No. 2 bundles	42.00
No. 1 busheling	49.50
Machine shop turnings	34.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	42.00
Heavy breakable cast	42.00
Unstripped motor blocks	*43.00*
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt	57.00
Rails, 18 in. and under	*73.00*
Rails, random lengths	*68.00*
Rails, rerolling	*74.50*
Angles, splice bars	*61.00*

PHILADELPHIA

No. 1 heavy melting	*51.00*
No. 2 heavy melting	*45.50*
No. 1 bundles	53.00
No. 2 bundles	*42.50*
No. 1 busheling	53.00
Electric furnace bundles	*55.00*
Mixed borings, turnings	*36.00*
Short shovel turnings	37.00-38.00
Machine shop turnings	34.00-35.00
Heavy turnings	*47.00*
Structurals & plate	58.00-59.00
Couplers, springs, wheels	67.50-68.00
Rail crops, 2 ft & under	69.00-71.00

Cast Iron Grades

No. 1 cupola	47.00
Heavy breakable cast	53.00
Malleable	62.00
Drop broken machinery	57.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*49.00-50.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*49.00-50.00*
No. 2 bundles	*37.50-38.00*
Machine shop turnings	*24.00-25.00*
Mixed borings, turnings	*25.00-26.00*
Short shovel turnings	*28.00-29.00*
Low phos. (structural & plate	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	39.00-40.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	*235.00-240.00*
18-8 borings, turnings	*135.00-140.00†*
430 sheets, clips, solids	60.00-70.00
410 sheets, clips, solids	50.00-55.00

†Nominal

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00-40.50*
No. 2 heavy melting	35.00-36.00
No. 1 bundles	*40.00-40.50*
No. 2 bundles	34.00-34.50
No. 1 busheling	*40.00-40.50*
Machine shop turnings	24.00-25.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	28.00-29.00
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	42.50-43.50
No. 1 bundles	49.00-50.00
No. 2 bundles	39.50-40.50
No. 1 busheling	49.00-50.00
Mixed borings, turnings	33.00-34.00
Machine shop turnings	31.00-32.00
Short shovel turnings	34.00-35.00
Cast iron borings	33.00-34.00
Low phos.	55.00-56.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.00-49.00
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	61.00-62.00
Rails, 3 ft and under	66.00-67.00
Railroad specialties	59.00-60.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	46.00-47.00
No. 1 bundles	52.00-53.00
No. 2 bundles	41.00-42.00
No. 1 busheling	52.00-53.00
Machine shop turnings	33.00-34.00
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	36.00-37.00
Cast iron borings	*28.00-29.00*
Low phos. 18 in.	59.00-60.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	56.00-57.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	64.00-65.00

BIRMINGHAM

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	49.00-50.00
No. 2 bundles	*33.00-34.00*
No. 1 busheling	49.00-50.00
Cast iron borings	*28.00-29.00*
Short shovel turnings	40.00-41.00
Machine shop turnings	39.00-40.00
Bar crops and plates	*55.00-56.00*
Structurals & plate	55.00-56.00
Electric furnace bundles	*50.00-51.00*
Electric furnace:	
3 ft and under	*48.00-49.00*
2 ft and under	*49.00-50.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	54.00-55.00
Stove plate	54.00-55.00
Unstripped motor blocks	*44.00-45.00*
Charging box cast	37.00-38.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	55.00-56.00
Rails, 18 in. and under	69.00-70.00
Rails, rerolling	*74.00-75.00*
Rails, random lengths	*63.00-64.00*
Angles, splice bars	60.00-61.00

SEATTLE

No. 1 heavy melting	*42.00*
No. 2 heavy melting	*40.00*
No. 1 bundles	*40.00*
No. 2 bundles	*29.00*
Machine shop turnings	*27.00*
Mixed borings, turnings	*27.00*
Electric furnace No. 1	*48.00*

Cast Iron Grades

No. 1 cupola	*38.00*
Heavy breakable cast	*35.00*
Unstripped motor blocks	*30.50*
Stove plate (f.o.b. plant)	*28.00*

LOS ANGELES

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	45.00
No. 2 bundles	38.00
Machine shop turnings	32.00
Shoveling turnings	34.00
Cast iron borings	32.00
Cut structural and plate, 1 ft and under	61.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	53.00

Railroad Scrap

No. 1 R.R. heavy melt	46.00

SAN FRANCISCO

No. 1 heavy melting	47.00
No. 2 heavy melting	45.00
No. 1 bundles	46.00
No. 2 bundles	35.00
Machine shop turnings	32.00
Mixed borings, turnings	32.00
Cast iron borings	32.00
Heavy turnings	32.00
Short shovel turnings	32.00
Cut structurals, 3 ft	56.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	45.00-47.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	43.00
Clean auto cast	55.00
No. 1 wheels	48.00
Drop broken machinery	53.00

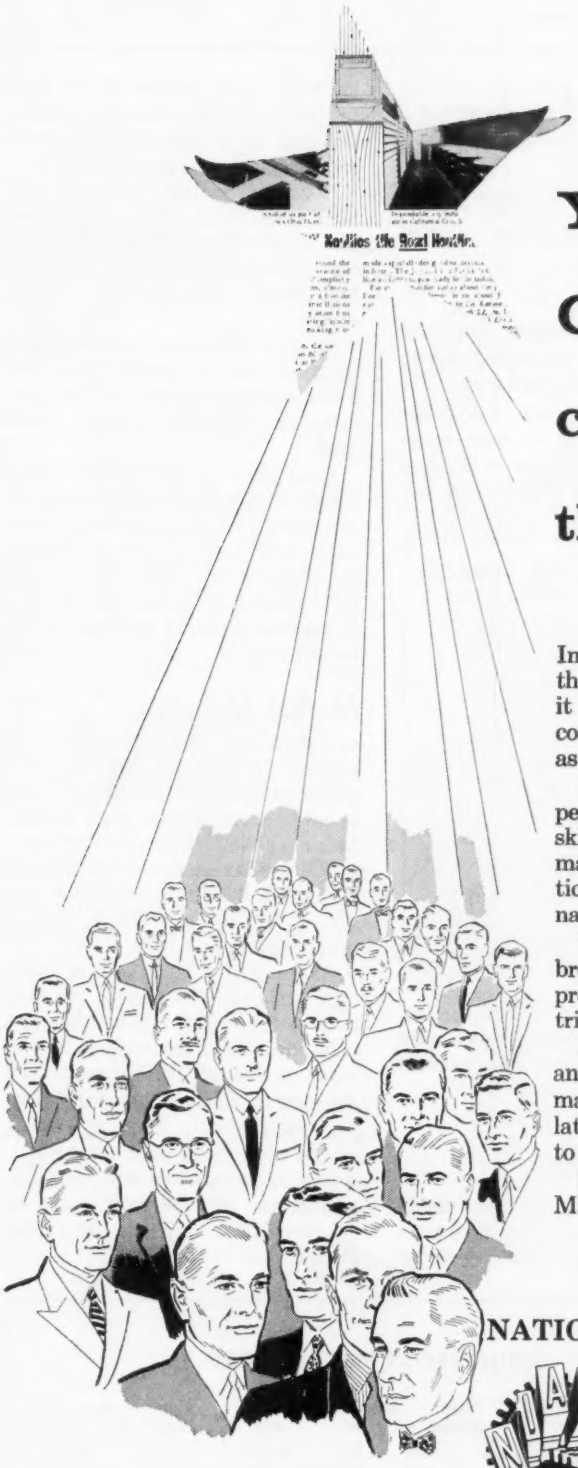
HAMILTON, ONT.

No. 1 heavy melting	50.00
No. 2 heavy melting	45.00
No. 1 bundles	50.00
No. 2 bundles	39.00
Mixed steel scrap	47.00
Mixed borings, turnings	24.00
Bushelling, new factory:	
Prepared	50.00
Unprepared	44.00
Short steel turnings	30.00
Rails, rerolling	61.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.



Your "STAR CONTACT MAN" counts his calls by thousands

Imagine a device that can equal the work of thousands of skilled men. Impossible? Perhaps it is, but industrial advertising—your "star contact man"—may easily make as many calls as 10,000 flesh and blood salesmen—or more.

Complete coverage of customers and prospects by the average industrial salesman—a skilled technician in his own right—requires many more hours than he has available. Particularly, if he must first sell his company name and explain the nature of its products.

To clear the way for the salesman by gaining broad recognition for his company and its products, manufacturers wisely turn to industrial advertising.

Never a substitute, but rather an essential and economical supplement to personal salesmanship, industrial advertising maintains relationships with present customers and helps to develop new ones.

Put industrial advertising on your "payroll." Make it a part of your selling team.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

Another Copper Dip Looms

Industry thinks weakness in custom smelter and foreign prices will lower primary quotation for fifth time this year. Lead and zinc continue to show slight gains

Nonferrous Metal Prices, Pages 208 & 209

PRIMARY COPPER, already hit with four price cuts this year, appears headed for another slash in quotations. While no major producer admits such plans, the cut appears imminent. Some observers predict the current price (28.50 cents a pound) will be chopped by 0.50 to 0.75 cents.

Background—Only recently, producers were hopeful that the red metal was finally pulling out of its slump. But three price reductions within seven days for custom smelted copper knocked the quotation down to 27 cents a pound, which is 1.50 cents under the primary level. This spread is too large to hold up, observers believe.

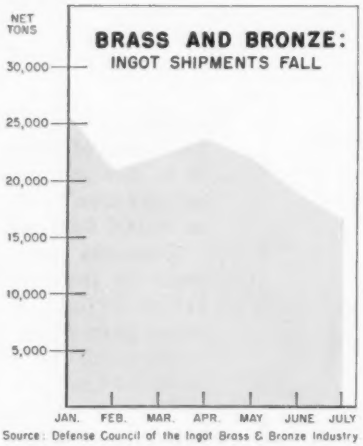
Further weakening the price of U. S. primary are foreign quotations: The London Metal Exchange is quoting 25.30 cents a pound; the Rhodesian Selection Trust, 26.25 cents (Aug. 26). Another factor: Katanga copper is selling for 26.80 cents, c.i.f., New York.

The culprit behind the metal's instability is too much production in the face of slack demand. Observers say there will have to be some drastic production cutbacks before the market will stabilize, but each producer seems hesitant to make the first move.

Carrousel—The industry is riding a merry-go-round that shows no signs of slowing down. Prices are dropped to stimulate buying, but each cut seems to make buyers more wary than ever of ordering substantial tonnages. An example: Custom smelters had no better sales at 27.25 cents than they did at 28.25 cents. That's why they went to 27 cents on Aug. 28—and some observers doubt that present demand will hold this.

Another phase of the price merry-go-round: Falling foreign quotations have a depressing effect on the American market, and the weak domestic situation causes softness on the foreign scene.

Observers point out this latest weakness came at a time when there was some pickup in demand for primary. A few producers say new orders remain a trifle better, but the slight pickup is not strong enough to stabilize the present price.



Source: Defense Council of the Ingot Brass & Bronze Industry

Lead, Zinc Firm

Lead and zinc appear more stable than copper. Lead sales have been improving steadily. Zinc is holding its own. Both prices should hold for the moment, although predictions of both upward and downward adjustments are heard.

Congress' refusal to enact any tariff legislation hasn't weakened the market noticeably, although one metalsman believes this will hold back a price upswing temporarily.

Sales to diecasters continue good for most zinc producers. There are a few scattered reports of the construction industry taking more lead.

Lead sales to battery manufacturers so far have not been up to expectations. One battery company says this is because orders for 1958 model cars are a little slow coming in from Detroit, but it reports a sharp pickup is expected shortly.

Market Memos

- Cuban American Nickel Co., subsidiary of Freeport Sulphur Co., has arranged a $100,250,000 loan to build a refinery at Port Nickel, La., near New Orleans. The plant will have an annual capacity of 50 million lb of nickel and 4.4 million lb of cobalt when it begins production in mid-1958.
- Shipments of magnesium castings came to 8773 tons in the first half, a drop of 277 tons from the 9050-ton figure registered in the same period of 1956, reports the Magnesium Association. Sand castings is the only category which shows an increase over last year.
- The auto industry will hike aluminum use in 1958 model cars by 15 per cent, predicts Reynolds Metals Co.

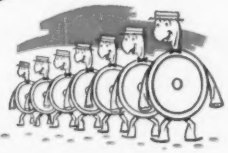
NONFERROUS PRICE RECORD

	Price Aug. 28	Last Change	Previous Price	July Avg	June Avg	Aug., 1956 Avg
Aluminum ..	28.10	Aug. 1, 1957	27.10	27.100	27.100	26.700
Copper	27.00–28.50	Aug. 28, 1957	27.25–28.50	28.822	30.250	39.750
Lead	13.80	June 11, 1957	14.80	13.800	14.120	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	34.694
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	93.50	Aug. 28, 1957	93.375	96.576	98.080	99.043
Zinc	10.00	July 1, 1957	10.50	10.000	10.840	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

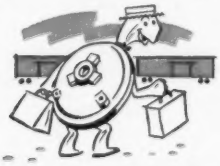
BOY!

LYNCHBURG FOUNDRY
SHELL CASTINGS
SAVE SAVE SAVE!

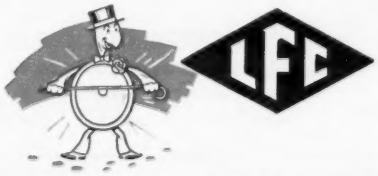


GREATER UNIFORMITY—They don't have to spend so much time getting ready to grind on me, and my shell has a better chance of pulling through the machine shop operation. Sometimes my shell has to be balanced, and the greater uniformity saves on this operation too...

LESS MACHINING—Fewer backaches! Close control of dimensions makes for less machining, faster machining methods, or in some instances elimination of machining altogether.



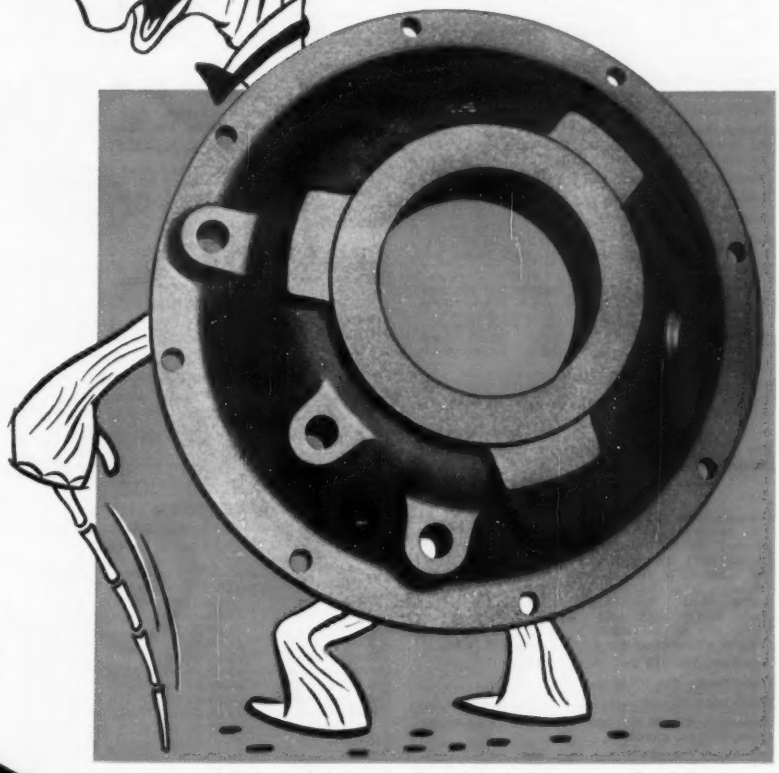
MADE FOR LIGHT TRAVEL—My Lynchburg Foundry shell surely makes for cheaper transportation fares — less machine stock makes me a "Light-Weight".



SUPERIOR SURFACE FINISH—I call it "eye appeal"—I really feel sharp in my Lynchburg Foundry shell molded shell. Saves wear on machine tools too.

GRAY IRON AND DUCTILE IRON—

Heat treated or as cast



You can't tell us turtles much about this shell game—we've been in it a long time—but I'd sure like for my whole family to hear about Lynchburg Foundry shell castings.

The snazzy outfit I'm wearing is called a gear box cover—shell molded, of course. You ought to have seen all the things that had to be done to an outfit like mine in the old days—before shell molding. But all that's changed—even the bolt holes around the edge are cast in. Then too, the pipe tap holes are cast so accurately that the drilling operation, which normally precedes the pipe tapping operation, is eliminated. And the machining that has to be done takes a lot less time—there's less machine stock, and the chucking lugs are cast so accurately.

As one shell man to another, take my advice—specify Lynchburg Foundry shell castings.

LYNCHBURG FOUNDRY CO., Lynchburg, Virginia

DISTRICT SALES OFFICES:

50 BROAD ST., NEW YORK, N.Y. • 122 SOUTH MICHIGAN AVE., CHICAGO, ILL. • 1783 E. 11TH ST., CLEVELAND, OHIO

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 28.50 deld.; custom smelters, 27.00; lake, 28.50 deld.; fire refined, 28.25 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, 13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $250-252 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 4.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz, nom.

Palladium: $21-22.50 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 93.50; prompt, 93.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-30.25; No. 12 foundry alloy (No. 2 grade), 22.25-22.75; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 25.25-26.75; 108 alloy, 22.75-23.00. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 24.00; grade 2, 22.25; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 28.75; tin bronze, No. 225, 38.00; No. 245, 32.75; high-leaded tin bronze, No. 305, 32.75; No. 1 yellow, No. 405, 23.50; manganese bronze, No. 421, 26.50.

Magnesium Alloy Ingot: AZ63A, 40.75; AZ91B, 37.25; AZ91C, 40.75; AZ92A, 40.75.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.84, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.82, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 33.855; l.c.l., 34.48. Weatherproof, 30,000-lb lots, 35.16; l.c.l., 35.91. Magnet wire deld., 15,000 lb or more, 41.93; l.c.l., 42.68.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.50-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.63b	47.86c	....	50.82	24.500	24.500	23.750
Yellow Brass	44.02	32.23d	44.56	46.93	18.375	18.125	16.625
Low Brass, 80%	46.70	46.64	47.24	49.51	20.750	20.500	20.000
Red Brass, 85%	47.64	47.58	48.18	50.45	21.500	21.250	20.750
Com. Bronze, 90%	49.13	49.07	49.67	51.69	22.375	22.125	21.625
Manganese Bronze	51.89	46.06	56.52	....	17.250	17.000	16.500
Muntz Metal	46.29	42.10	....	....	17.250	17.000	16.500
Naval Brass	48.19	42.50	55.25	51.60	17.000	16.750	16.250
Silicon Bronze	55.20	54.39	55.24	57.21e	24.000	23.750	23.000
Nickel Silver, 10%	60.41	62.74g	62.74	....	24.625	24.375	12.313
Phos. Bronze, A-5%	69.61	70.11	70.11	71.29	25.375	25.125	24.125

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 20.50-21.00; No. 2 heavy copper and wire, 19.00-19.50; light copper, 17.00-17.50; No. 1 composition red brass, 15.50-19.00; No. 1 composition turnings, 18.00-18.50; yellow brass turnings, 10.75-11.25; new brass clippings, 17.00-17.50; light brass, 10.50-11.00; heavy yellow brass, 12.50-13.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 14.50-15.00; brass pipe, 15.50-16.00.

Lead: Heavy 9.50-10.00; battery plates, 4.25-4.50; linotype and stereotype, 11.50-12.00; electrotype, 10.00-10.50; mixed babbitt, 11.00-11.50.

Monel: Clippings, 45.00-50.00; old sheets, 45.00-50.00; turnings, 35.00-40.00; rods, 45.00-50.00.

Nickel: Sheets and clips, 75.00-80.00; rolled anodes, 75.00-80.00; turnings, 55.00-60.00; rod ends, 75.00-80.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00-17.50; 3003 clippings, 17.00-17.50; 6151 clippings, 16.50-17.50; 5052 clippings, 16.50-17.00; 2014 clippings, 16.00-17.00; 2017 clippings, 16.00-17.00; 2024 clippings, 16.00-17.00; mixed clippings, 15.50-16.00; old sheets, 13.50-14.00; old cast, 13.50-14.00; clean old cable (free of steel), 16.50; borings and turnings, 14.00-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 22.50; No. 2 heavy copper and wire, 20.50; light copper, 18.25; refinery brass (60% copper) per dry copper content, 20.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 22.50; No. 2 heavy copper and wire, 20.50; light copper, 18.25; No. 1 composition borings, 20.00; No. 1 composition solids, 20.50; heavy yellow brass solids, 14.50; yellow brass turnings, 13.50; radiators, 15.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 46.79; oval, 45.00, 5000-10,000 lb; electrodeposited, 38.75, 2000-5000 lb lots; cast, 39.25, 5000-10,000 quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 14.95; 2000-5900 lb, 12.95; 6000-11,900 lb, 12.70; 12,000-22,900 lb, 12.45; 23,000 lb or more, 11.95.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400-4900 lb, 35.50; 5000-29,900 lb, 33.50; 30,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 2000-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 203*)

ings and cast iron borings dropped $2 a ton to $28-29.

St. Louis—Railroad and cast scrap prices have dropped $1 to $4 a ton. A corresponding drop in heavy melting steel was forecast at the close of last week. The market has been weakened by an increasing supply of material coming in from industrial and rural sources.

Birmingham — The market was quiet last week. Consumers bought only small tonnages; offerings were restricted. Dealers are not anxious to sell scrap because of the slow movement of material into yards. Major open-hearth consumers remain out of the market.

The cast market is steady with no price changes recorded. Some consumers of cast are beginning to drop out of the market.

Early in the week, one user of electric furnace grades dropped his price $1 a ton on electric furnace steel and electric furnace bundles.

Seattle—The scrap market underwent another $2 decline last week. Activity is restricted since large buyers have substantial inventories. The export situation is extremely quiet.

ROLLING MILL SUPERINTENDENT

Experience in non-ferrous rolling mill operation required. Excellent opportunity for man with Metallurgical background. Will head up a newly formed department with a pioneer company in production of

pure beryllium and beryllium copper.

Will assist in selection and installation of various rolling mills and related equipment.

Will also select and train key personnel to operate Hot Rolling, Cold Rolling, Finish Rolling, Form Rolling, and possibly Extrusion Press Equipment.

Replies will be held confidential. For further information call collect or submit resume to:

BRUSH BERYLLIUM CO.
Luckey, Ohio

Attention of: **Mr. R. Y. Heimsath,** Personnel Director

CLASSIFIED

Positions Wanted

JR. EXECUTIVE—PRESENTLY PRODUCTION MANAGER STEEL FABRICATION PLANT WITH 80 EMPLOYEES. 5 YEARS EXPERIENCE AS INDUSTRIAL ENGINEER. RESUME ON REQUEST. AGE 30. WRITE BOX 586, STEEL, PENTON BLDG., CLEVELAND 13, OHIO

NINE YEARS EXPERIENCE IN MACHINE DESIGN, Plant work, structural steel, sales engineering (three years traveling), and engineering supervision. Also a degree in Industrial Engineering. Write Box 579, STEEL, Penton Bldg., Cleveland 13, Ohio.

FORGING PRESS

1200 Ton UNITED Steam hydraulic— Very good condition

48" stroke—6' R to L. Complete with intensifier and valve gear. Available immediately.

Address Box 577, care STEEL, Penton Bldg., Cleveland 13, O.

GET CASH NOW

for your new surplus motors, controls and transformers!

NEW MOTORS AVAILABLE: Over 5,000 new motors, in stock, from ¼HP to 200 HP. Special low prices. Write, wire or phone collect!

AJAX ELECTRIC MOTOR CORP.
P.O. Box 262, Rochester, N.Y.
Long Distance Phone LD. 132

FOR SALE
20 TONS ALNICO INGOTS
(30 lbs. each) CO + NI + FE = 99.38%
Processed by Primary company
Call or write
DIESEL CHEMICAL & METAL CO.
578 S. Carroll Street, Brooklyn, N. Y.
Phone MAin 2-0703
Buyers—Sellers of all Nickel & Cobalt Alloys

CONTRACT MANUFACTURING WANTED
ALUMINUM AND STEEL

Well established, large volume manufacturer of high precision sheet and extrusion aluminum and stainless steel products invites your inquiries. Stamping, milling, forming, broaching, finishing, assembly, packing. Modern plant facilities; experienced and highly trained production and engineering personnel: AA-A1 rated. Inquiries also invited from qualified Manufacturer's Representatives. **Box No. 582, STEEL, Penton Bldg., Cleveland 13, Ohio.**

FOREMAN

Progressive New Jersey organization has opening in supervision for experienced Drop Forge Foreman. Must be familiar with all phases of steam and board hammer operation. Top salary to qualified individual. All employee benefits. Write giving full details in first letter.

McWILLIAMS FORGE CO., INC.
FRANKLIN ROAD
ROCKAWAY, N.J.

STEEL SALES OPPORTUNITIES

Salesmen with specialty steel sales experience for the following available territories: Chicago; Toronto, Canada; Baltimore; Atlanta; Dallas; Houston; Philadelphia; and Los Angeles.

Also, Manufacturers Representatives with industrial following. Good commission, exclusive territory. Our men know of this ad. Write for full information.

Box No. 585, STEEL
Penton Bldg. Cleveland 13, Ohio

you'll save
on blast cleaning costs
Malleabrasive reduces overall cleaning costs as much as 50% because—
• It wears 2 to 4 times longer than ordinary shot and grit.
• It increases output of cleaned castings.
• It reduces wear on machine parts and cuts machine down time.
These are not just claims. You can prove these savings right in your own plant, in your own machines. We supply all the necessary forms and instructions.
Malleabrasive has reduced costs in more than 800 plants. Why not yours?
make your own 30 day test...
These forms will show you how. Write for samples and information
50 LBS.
MALLEABRASIVE
GLOBE
STEEL ABRASIVE CO.
DAILY Shift Record
RESUME OF TESTS
Standard Abrasive vs. Malleabrasive
In easy to handle 50-pound Double Burlap Bags.
MALLEABRASIVE
THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®
1907—Fiftieth Anniversary—1957

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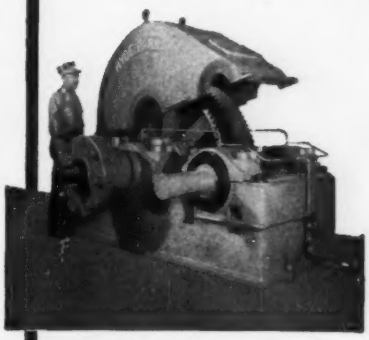
RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
Send your blue prints for quotation.



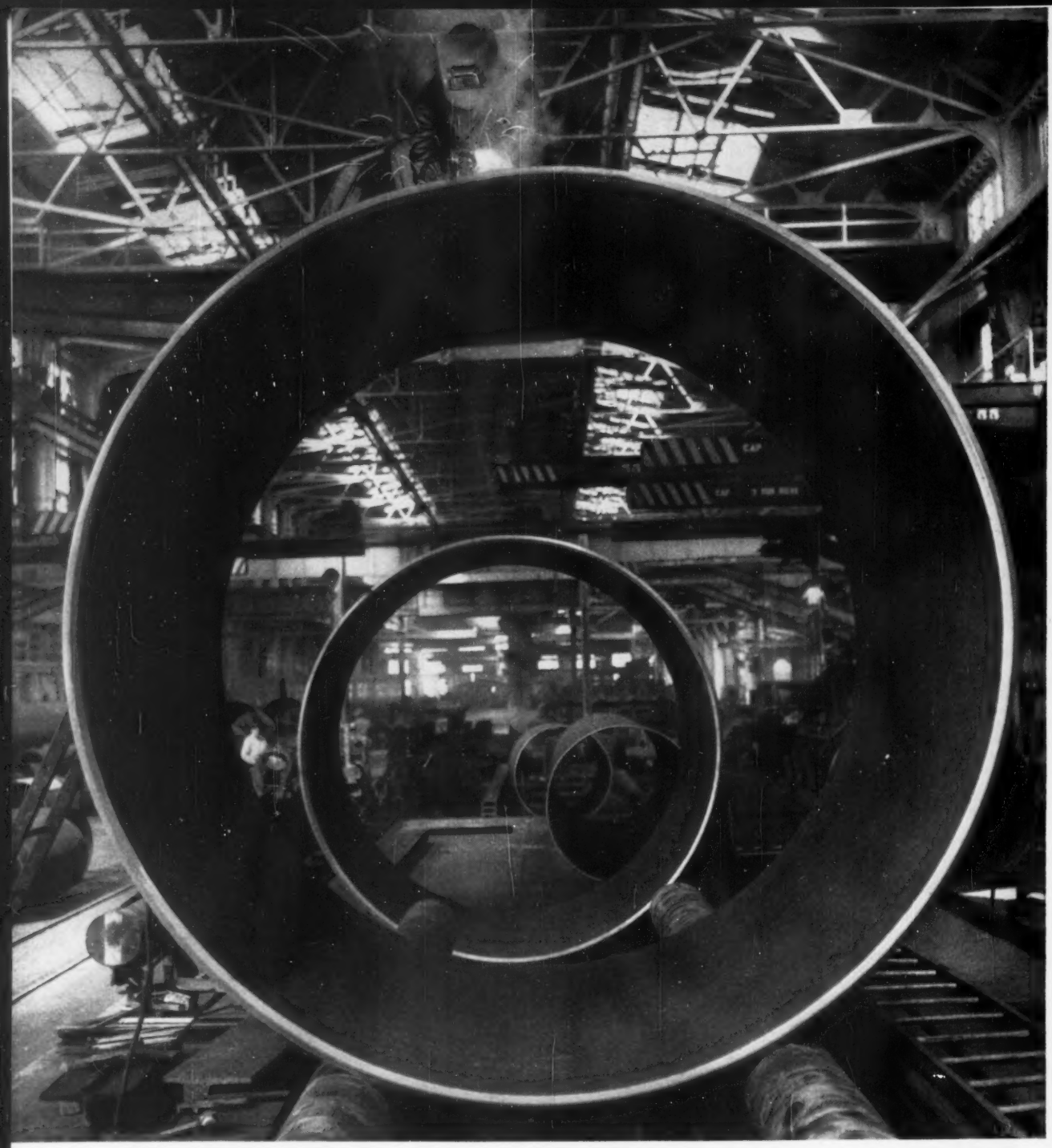
Mill Drive

Machine Castings
Lathe Beds
Housings
Pinion Housings
Mill Housings
Shoe Plates
Layout Plates
Surface Plates

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS



WELDING STEEL PLATES

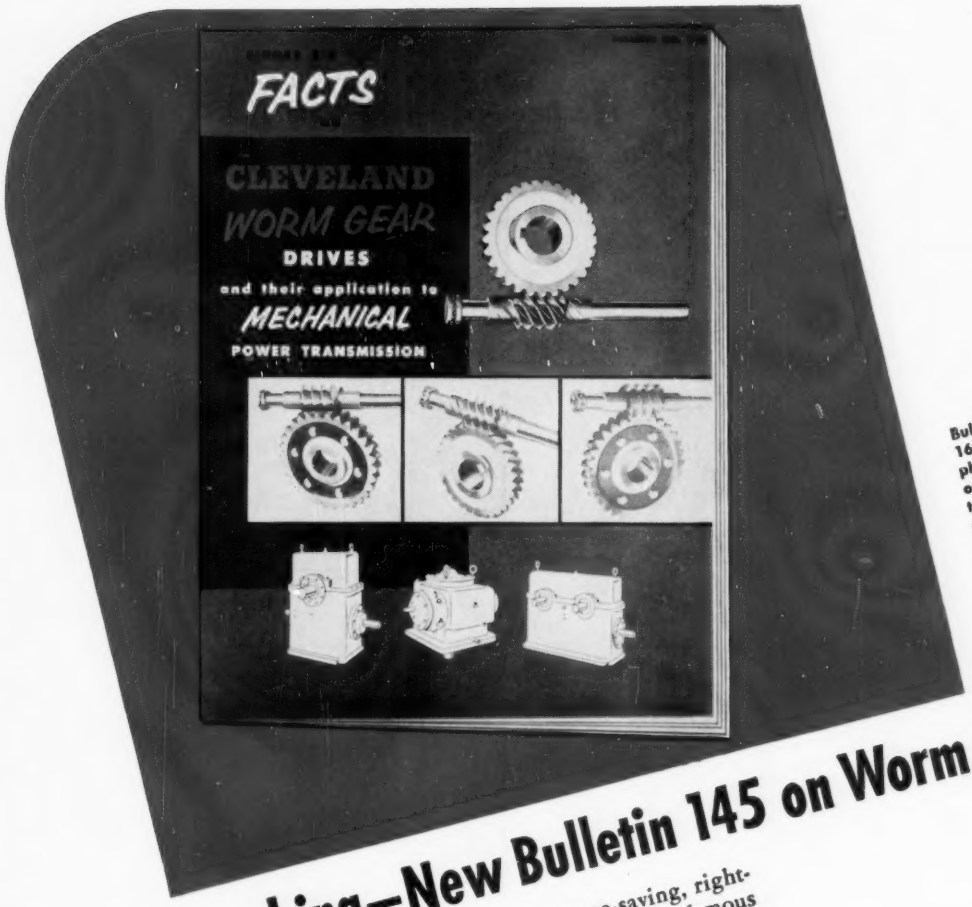
Large-diameter pipe, shown here being welded from Bethlehem plates, is a typical example of a welded structure in which the fabricator's prime responsibility is to make a sound weld. Bethlehem plates are uniform in quality, so that with good welding practice, sound welds are assured. Bethlehem plates come in a full range of sheared or universal mill sizes. Write or phone the nearest Bethlehem sales office for complete information.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor*: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



Bulletin 145 gives you 16 fact-filled pages of photographs and data on standard and custom-designed worm gear speed reducers and worm gearing components for built-in drives.

Yours for asking—New Bulletin 145 on Worm Gearing

WHENEVER you want a safe, space-saving, right-angle drive, you specify Cleveland. This famous worm-gear drive transmits power uniformly, smoothly, dependably, under even the most severe operating conditions, for a lifetime of trouble-free service. Clevelands actually improve with use. Thousands of units outlast their driven machines.

To know what Cleveland best meets any need—for speed reducer or worm-gear set—standard or special—write for new Bulletin 145. Just off press, it will bring your file up to date on this ever more popular drive. The Cleveland Worm & Gear Company, 3270 E. 80th St., Cleveland 4, O.

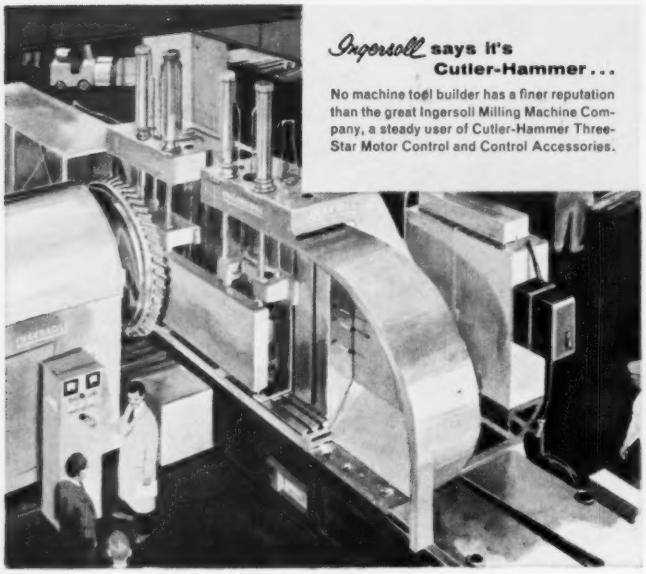
Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.

CLEVELAND
Worm Gear
Speed Reducers

The leaders have a name for it

Carrier says it's Cutler-Hammer...

Dependability is of extreme importance when equipment is installed thousands of miles from its point of manufacture. This Carrier Air Conditioning installation, completely equipped with Cutler-Hammer Motor Control, is in the Theatro Municipal, Rio de Janeiro, Brazil.



Ingersoll says it's Cutler-Hammer...

No machine tool builder has a finer reputation than the great Ingersoll Milling Machine Company, a steady user of Cutler-Hammer Three-Star Motor Control and Control Accessories.

Black and Decker says it's Cutler-Hammer...

Black & Decker portable electric tools have won world-wide respect for their high quality, dependable performance, and reliable service. Cutler-Hammer tool handle switches are used extensively.

The proper performance of any type of equipment powered by electric motors depends very directly on the proper performance of the motor control used, whether this control is a small switch in the handle of an electric drill or many panels of control units for industry's newest marvel of automation. No tool, machine, or assembly of complex mechanisms can be any more dependable than its control component.

This importance of dependability in motor control has long been recognized by the leading manufacturers of machines and equipment using it. Their successes and reputations could not have been won without it. There must be much meaning in the fact that so many of these leaders building so many different kinds of motorized products have agreed on *one* name for dependable motor control . . . Cutler-Hammer!

When you seek dependable performance in the machines you build or the machines you buy, specify Cutler-Hammer Motor Control.

, , , CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

Cutler-Hammer Three-Star Motor Control, the most advanced general purpose motor control, is stocked for your convenience by a nationwide network of Authorized Cutler-Hammer Distributors.

CUTLER-HAMMER
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MOTOR CONTROL
C-H